CLASS 330, AMPLIFIERS

SECTION I - CLASS DEFINITION

(A) This is the generic class for amplifiers as limited by the definition of amplifiers as it appears in the Glossary below.

(B) Included are amplifiers having all types of active elements (or amplifying devices, the term used in this class) as for example vacuum tubes, gas tubes, semiconductors, magnetic type saturable reactors, masers, etc.., as set forth in the specific subclasses in the schedule for the class. Specific types of vacuum tube amplifier devices included are, traveling wave type tubes, secondary emission type tubes, electron beam tubes, magnetrons, etc.

(C) Included are amplifier systems having plural amplifier channels, cascade amplifiers, push-pull amplifiers and other amplifiers having plural amplifier devices. Also included are amplifiers with plural signal sources or plural loads, as for example sum or difference amplifiers which have plural sources.

(D) Amplifiers including the means coupling the signal source to the amplifier or coupling the amplifier to the load or between cascaded stages are also included herein. Such coupling means include those of the distributed parameter type, resonant tuned circuits, filters, coupling designed to pass a broad band, D.C. coupled circuits, potentiometer means for volume control, equalizers, circuits for volume control, etc.

(E) Amplifiers combined with tone control means are also included herein as indicated in D above for the type included in the amplifier coupling means, also included herein are those tone control amplifiers relying on signal feedback means to effect the tone control.

(F) Amplifiers combined with amplitude (volume) control means whether by manual control, by control of an electrode D.C. bias, as in gain control, or by controlling a variable impedance means for the signal transmission path of the amplifier are also included herein.

(G) Amplifiers combined with power supply means for such amplifier are also included herein, as well as means to control the voltage or current of such means.

(H) Amplifiers combined with structural features of the amplifier or the amplifier circuit elements including structure of the amplifier device, capacitors, transformers, etc.

(I) Amplifiers having signal feedback means.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

A. TWO-TERMINAL NEGATIVE RESISTANCE NETWORKS

Such networks containing an active element (amplifying device) are not classified in this class, but classified elsewhere. (See References to Other Classes, below.)

B. LIMITERS

Passive networks which limit the signal amplitude voltage or current are classified elsewhere. Miscellaneous limiting circuits with active device elements are classified elsewhere. (See References to Other Classes, below.)

C. MISCELLANEOUS ELECTRONIC TUBE CIRCUITS

Circuits including electron tubes (other than the limiters discussed above) in which the signal output is not a substantial replica of the input signal, are classified residually elsewhere. Examples of such tube circuits are wave conversion circuits, miscellaneous pulse generating systems, and electronic tube gating circuits. (See References to Other Classes, below.)

D. SATURABLE REACTOR CIRCUITS (MAGNETIC AMPLIFIERS)

Such circuits which control voltage or current and are not classifiable herein (as for example, where the A.C. power supply current is not removed from the signal output by filtering or other means) are classified elsewhere. Saturable reactor circuits for wave shaping, switching, pulse production, etc., analogous to similar electronic tube circuits are classified elsewhere with nonlinear reactor systems, and computers using magnetic amplifiers are also classified elsewhere. (See References to Other Classes, below.)

E. NONLINEAR REACTOR CIRCUITS:

Where a nonlinear capacitor serves as the active element or amplifying device in a circuit which switches, shapes a wave, or produces pulses and is not provided for elsewhere classification is in Class 307. So called amplifier circuits including a nonlinear capacitor as the amplify-

ing device, which have an A.C. source where the claims do not provide a filter to remove the A.C. source from the output or where a demodulator is claimed and no filter or other means to remove the A.C. power supply from the signal output circuit is disclosed, are excluded from this class. (See References to Other Classes, below.)

F. MISCELLANEOUS TRANSISTOR CIRCUITS:

Transistor circuits which are not amplifiers or not combined with an art device or in a system specifically provided for in some class, are classified elsewhere. Such art as miscellaneous transistor wave shapers, gating circuits, limiters, and pulse producers are classified therein. (See References to Other Classes, below.)

G. AMPLIFIER COMBINED WITH SPECIFIC SOURCE OF SIGNAL ENERGY:

This class does not provide for combinations of amplifiers with a specific source of electric signal, such as a microphone which limits the system to use with a particular art even though the source is claimed by name only. Similarly, where the source is claimed by characteristics specific to the art device as for example, "a source of speech signals" classification is not in this class. However, classification is in this class where the source is claimed by its electrical characteristics not specific to the source device, as for example, "a high impedance source of electrical signal". Where the specific source, or details thereof are claimed, classification is with the art device so identified. (See References to Other Classes, below.)

Generator or Oscillator Claimed By Name Only

The terms generator or oscillator in claims, where they appear as sources of signal energy without further qualification except by their electrical characteristics such as impedance, reactance, etc., are treated as generalized sources of signal energy, and classification is with amplifiers except where specific details of the generator or oscillator are claimed; in such cases classification is with the type of generator claimed or with oscillators. (See References to Other Classes, below.)

H. AMPLIFIERS COMBINED WITH SPECIFIC LOAD:

Where the load is claimed, broadly, or by name only as a specific electrical art device, as for example, as a loudspeaker, classification is not in this class but with the load art device claimed. Where characteristics of the load device are claimed, which are peculiar to the disclosed electrical art device or to a specific type of electrical art device, classification is with the load art device established in the claim. Subject matter wherein general electrical characteristics of the load are claimed, as for example, "a load having a variable impedance," is classified in this or indented subclasses. (See References to Other Classes, below)

I. OSCILLATOR AS A LOAD FOR AN AMPLIFIER

Subject matter wherein an amplifier is combined with an oscillator as load for the amplifier is classified with amplifiers when the oscillator is claimed by name only; where specific details of the oscillator are claimed, classification is elsewhere. (See References to Other Classes, below.)

J. REPEATERS:

Devices known in the art as repeaters which are in effect two-way amplifiers are not classified in this class but are classified elsewhere. (See References to Other Classes, below.)

K. AMPLIFIERS COMBINED WITH LONG LINE TRANSMISSION MEANS OR DISTRIBUTED PARAMETER ELEMENTS, AND AMPLIFIERS COMBINED WITH WAVE FILTERS, EQUALIZERS OR ATTENUATORS:

Such subject matter is classified herein even though the amplifier is claimed by name only, if some detail of the co-operation of the amplifier with the passive network (coupling) is claimed. (See References to Other Classes, below.)

L. COMPANDERS INCLUDING AMPLIFIERS:

Systems including means to compress a signal wave, an electrically long transmission line and means to expand the signal wave are not classified herein even when they include details of an amplifier. Companders are classified elsewhere. Amplifiers with compressor or expander means alone not involving a complete compander system are classified herein. Such subcombinations involving connection or maintenance of a predetermined condition of the transmission line are classified elsewhere. Where such connection is of an amplifier condition classification is herein. (See References to Other Classes, below.)

M. SYSTEMS INCLUDING PILOT CONTROL MEANS:

Amplifiers including a pilot control frequency component in the signal source which is used to control the amplifier are classified herein.

Transmission Lines Combined With Pilot Control - Such subject matter is classified elsewhere when provided with an auxiliary line for the pilot control signal; for those systems in which the pilot control signal is combined with the signal to be transmitted; with an amplifier which is controlled must correct or maintain a predetermined condition of the transmission line for classification elsewhere. Otherwise classification is herein.

Pilot Frequency Controlled Repeaters - Such subject matter is classified elsewhere.

N. GAS OR VAPOR TUBE CIRCUITS IN OTHER CLASSES:

Gas or vapor tube circuits are classified elsewhere. (See References to Other Classes and Within This Class.)

O. TRAVELING WAVE TUBES AND CIRCUITS:

Classification of traveling wave tube amplifiers is in this class when it includes the output or load circuit. Classification is otherwise where no load or output circuit is claimed and the circuit means which may be involved are an integral part of the tube. Oscillators including a traveling wave tube are classified elsewhere. (See References to Other Classes, below.)

P. AMPLIFIER AND A DETECTOR OR SUPERHETERODYNE CONVERTER AND AN AMPLIFIER:

Such subject matter involves a subcombination peculiar to radio receivers and is classified elsewhere with radio receivers or in appropriate subclasses for a demodulator with amplifier. When an amplifier and a detector are claimed and the detector is claimed merely as a means to develop a control signal and not for the purpose of detecting the intelligence signal as a function of a receiver, classification is herein and not in receivers. Where the same tube serves both as a detector and an amplifier classification is not in this class but elsewhere. Demodulators, depending again upon the type of demodulator involved, are classified elsewhere. Combinations which comprise a reflex amplifier or a superregenerative detector are classified elsewhere. (See References to Other Classes, below.)

Q. VOLTAGE MAGNITUDE CONTROL SYSTEMS:

Voltage magnitude control (for single source energy systems) such as line voltage control, etc., in general, is classified elsewhere and includes current or load regulation, current and voltage limiting systems, transformer and impedance systems for the purpose. See LIMITERS, above. (See References to Other Classes, below.)

R. SYSTEM OR DEVICES CLOSELY RELATED TO OR ANALOGOUS TO AMPLIFIERS:

See References to Other Classes, below.

S. SYSTEMS UTILIZING AMPLIFIERS:

The great majority of electrical control or signaling systems utilize amplifiers such as are classified herein or closely related devices (as where the waveform of the input is not retained in the output). Such systems include, also, mechanical systems with electrical control means. In view of such widespread use no attempt is made to list the classes of all or a large number of systems utilizing amplifiers. Systems involving amplifiers in combinations where the amplifier is invariably present, involve few additional elements, or wherein the amplifier is usually an important component of the combination are classified elsewhere.

Also see References to Other Classes, below.

T. ELEMENTS OR CIRCUIT NETWORKS COMMONLY USED IN AMPLIFIERS OR AMPLIFIER SYSTEMS:

See References to Other Classes, below.

SECTION III - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

174, Electricity: Conductors and Insulators, subclasses 32+ for shielding means. (See Lines With Other Classes, T, "Elements or Circuit Networks Commonly Used in Amplifiers," above.)

250, Radiant Energy, appropriate subclasses, for the detection of invisible radiant energy or the testing of materials by invisible radiant energy, subclasses 200+ for photocell circuits and apparatus, particularly subclass 214 for photocell controlled circuits including electron tube circuits. (See Lines With Other Classes, S, "Systems Utilizing Amplifiers," above.)

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), for active solid state devices, per se. (See Lines With Other Classes, T, "Elements or Circuit Networks Commonly Used in Amplifiers or Amplifier Systems," above.)

307, Electrical Transmission or Interconnection Systems, for saturable reactor circuits for wave shaping, switching, pulse production, etc., analogous to similar electronic tube circuits; subclasses 401+ for nonlinear reactor systems. So called amplifier circuits including a nonlinear capacitor as the amplifying device, which have an A.C. source where the claims do not provide a filter to remove the A.C. source from the output or where a demodulator is claimed and no filter or other means to remove the A.C. power supply from the signal output circuit is disclosed is classified in subclasses 401+. (See Lines With Other Classes, D, "Saturable Reactor Circuits (Magnetic Amplifiers)." E, "Nonlinear Reactor Circuits." and R, "System or Devices Closely Related to or Analogous to Amplifiers," above.)

313, Electric Lamp and Discharge Devices, appropriate subclasses for the structure of vacuum tubes and gas and vapor tubes. See the class definition of Class 313. (See Lines With Other Classes, T, "Elements or Circuit Networks Commonly Used in Amplifiers," above.)

315, Electric Lamp and Discharge Devices: Systems, for gas or vapor tube circuits in other classes; see the classes specified in the Notes thereto for gas or vapor tube circuits. (See Lines With Other Classes, N, "Gas or Vapor Tube Circuits in Other Classes.")

315, Electric Lamp and Discharge Devices: Systems, subclasses 3.5, 3.6 or 39.3 for classification otherwise where no load or output circuit is claimed and the circuit means which may be involved are an integral part of the tube. (Lines With Other Classes, O, "Traveling Wave Tubes and Circuits").

323, Electricity: Power Supply or Regulation Systems, for passive networks which limit the signal amplitude voltage or current. (Lines With Other Classes, B, "Limiters.")

323, Electricity: Power Supply or Regulation Systems, for circuits which control voltage or current. (See Lines With Other Classes, D, "Saturable Reactor Circuits (Magnetic Amplifiers.")

323, Electricity: Power Supply or Regulation Systems, for voltage magnitude control (for single source energy systems) such as line voltage control, etc., in general (see the class definition). (Lines With Other Classes, "Voltage Magnitude Control Systems").

324, Electricity: Measuring and Testing, subclasses 123+ for amplifiers with meters.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 309+ for miscellaneous limiting circuits with active device elements.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 100+ for wave conversion circuits, subclasses 291+ for miscellaneous pulse generating systems, and subclasses 365+ for electronic tube gating circuits. (Lines With Other Classes, C, "Miscellaneous Electronic Tube Circuits.")

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for transistor circuits which are not amplifiers or not combined with an art device or in a system specifically provided for in some class. (See Lines With Other Classes, F, "Miscellaneous Transistor Circuits.")

329, Demodulators, appropriate subclasses for a demodulator with amplifier. (See Lines With Other Classes, P, "Amplifier and a Detector or Superheterodyne Converter and an Amplifier" and S, "Systems Utilizing Amplifiers," above.)

329, Demodulators, where the same tube serves both as a detector and an amplifier, depending upon the type of demodulator involved. (Lines With Other Classes, P, "Amplifier and a Detector or Superheterodyne Converter and an Amplifier").

331, Oscillators, are in the most common types, in a sense, merely positive feedback amplifiers without an input, and therefore the circuits, structures, and problems are often closely related to those of amplifiers. (See Lines With Other Classes, R, "System or Devices Closely Related to or Analogous to Amplifiers," above.)

331, Oscillators, where specific details of the generator or oscillator are claimed; in such cases classification is with the type of generator claimed or with oscillators. (See Lines With Other Classes, G, under "Generator or Oscillator Claimed by Name Only," and I, "Oscillator as a Load for an Amplifier," above.)

331, Oscillators, for oscillators including a traveling wave tube; subclass 82 for traveling wave type. (Lines With Other Classes, O, "Traveling Wave Tubes and Circuits").

332, Modulators, appear, usually as no more than amplifiers which have an input source in addition to the signal (i.e., the carrier). (See Lines With Other Classes, R, "System or Devices Closely Related to or Analogous to Amplifiers," above.)

333, Wave Transmission Lines and Networks, appropriate subclasses, particularly subclasses 24+, for passive wave filters and coupling networks. (See Lines With Other Classes, T, "Elements or Circuit Networks Commonly Used in Amplifiers or Amplifier Systems," above.)

333, Wave Transmission Lines and Networks, subclasses 213+for networks containing an active element (amplifying device). (See Lines With Other Classes, A, "Two-Terminal Negative Resistance Networks," above.)

333, Wave Transmission Lines and Networks, subclass 14 for companders. Subcombinations involving connection or maintenance of a predetermined condition of the transmission line are classified in Class 333. (See Lines With Other Classes, L, "Companders Including Amplifiers.")

333, Wave Transmission Lines and Networks, subclass 15, when provided with an auxiliary line for the pilot control signal, subclass 16 for those systems in which the pilot control signal is combined with the signal to be transmitted and also subclass 16 with an amplifier which is controlled must correct or maintain a predetermined condition of the transmission line. (Lines With Other Classes, M, under "Transmission Lines Combined With Pilot Control," above.)

333, Wave Transmission Lines and Networks, for electric wave transmission systems, passive wave transmission networks, passive coupling networks and terminating networks, smoothing type wave filters, networks including a wave transmission device, passive networks for producing an output wave, systems including active elements, and wave traps using long line elements. (Lines With Other Classes, K, "Amplifiers Combined With Long Line Transmission Means or Distributed Parameter Elements, and Amplifiers Combined With Wave Filters, Equalizers or Attenuators").

334, Tuners, appropriate subclasses for tuners, per se. (See Lines With Other Classes, T, "Elements or Circuit Networks Commonly Used in Amplifiers," above.)

336, Inductor Devices, appropriate subclasses for the structure of transformers and inductor devices, generally. (See Lines With Other Classes, T, "Elements or Circuit Networks Commonly Used in Amplifiers or Amplifier Systems," above.)

361, Electricity: Electrical Systems and Devices, subclasses 196+ for electric circuits including transistors, subclasses 199+ and 205 for electric circuits including space discharge devices combined with relays as the load therefor, and subclass 204 for electric circuits including saturable reactors, wherein the transistor, space discharge, or saturable reactor circuit may be an amplifier. (See Lines With Other Classes, S, "Systems Utilizing Amplifiers", above.)

361, Electricity: Electrical Systems and Devices, subclasses 271+ and 500+ for capacitor structure, per se. (See Lines With Other Classes, T, "Elements or Circuit Networks Commonly Used in Amplifiers or Amplifier Systems," above.)

379, Telephonic Communications, subclasses 338+ for devices known in the art as repeaters which are in effect two-way amplifiers. (See Lines With Other Classes, J, "Repeaters," above.)

381, Electrical Audio Signal Processing Systems and Devices, subclasses 111+ for miscellaneous systems which include combinations of amplifier and loud speaker or microphone and amplifier which limits the system to use with a particular art even though the source is claimed by name only; for distribution systems, involving a central broadcasting system from which programs are distributed to local stations where the programs are amplified and reproduced; also for where the load is claimed, broadly, or by name only as a specific electrical art device, as for example, as a loudspeaker. (See Lines With Other Classes, G, "Amplifier Combined With Specific Source of Signal Energy," H, "Amplifiers Combined With Specific Load," and S, "Systems Utilizing Amplifiers," above.)

398, Optical Communication, subclasses 1 through 8 for light wave communications. (See Lines With Other Classes, S, Systems Utilizing Amplifiers, above.)

455, Telecommunications, subclasses 130+ for radio receivers which may be limited to an amplifier and a detector; subclass 351 for portable radio receivers. (See Lines With Other Classes, S, "Systems Utilizing Amplifiers," above.)

455, Telecommunications, appropriate subclass, particularly subclass 335, where the same tube serves both as a detector and an amplifier. Class 455, subclass 342, includes combinations which comprise a reflex amplifier or subclasses 336+ for combinations which comprise a superregenerative detector. (Lines With Other Classes, P, "Amplifier and a Detector or Superheterodyne Converter and an Amplifier")

455, Telecommunications, subclasses 130+ for a subcombination peculiar to radio receivers classified with radio receivers. (See Lines With Other Classes, P, "Amplifier And a Detector or Superheterodyne Converter And An Amplifier.")

505, Superconductor Technology: Apparatus, Material, Process, subclasses 150+ for high temperature (T_c 30 K) superconducting device; and particularly subclass 180 for maser-type amplifying device, or subclasses 191+ for semiconductor device. (See Lines With Other Classes, R, "System or Devices" Closely Related to or Analogous to Amplifiers, S, "Systems Utilizing Amplifiers", and T, "Elements or Circuit Networks Commonly Used in Amplifiers,"above.)

SECTION IV - GLOSSARY

ACCEPTOR IMPURITY OR ACCEPTOR

A material which when added to a semiconductor material in minute quantities, as an impurity, induces hole conduction, generally causing the semiconductor to be one of "P-type conductivity".

ACTIVE NETWORK

A network containing a source of energy, or a sink of energy (i.e., a device for absorbing or dissipating energy other than that accounted for by the resistance of the components of the networks). Merely dissipating the heat generated by a resistance will not cause the resistance to be an active element. See Amplifying Device.

AMPLIFIER

Electric circuit means wherein a variable electrical current or voltage input signal is applied to an electrical amplifying device to control a source of electrical energy applied to the same device and from which is derived an output signal of substantially the same wave form as the input signal and substantially linearly related thereto.

AMPLIFIER CHANNEL OR CHANNEL

A part of an amplifier system in which a single signal path may be traced from a source to a load, and which path includes an amplifier as defined above. Such channel may be a cascade amplifier.

AMPLIFYING DEVICE

An electrical transducer of the active type wherein the electrical energy supplied by one system (power supply) is controlled by the electrical energy supplied by another system (signal source) limited to the active transducer device element itself such as a vacuum tube, transistor, controllable gas tube, saturable reactor, variable resistive element, etc.. See Active Elements.

AMPLITUDE LIMITER

A means in a circuit to limit the amplitude of the electrical voltage across it or the current in it to a value below or above a fixed predetermined value, particularly the former.

ANODE

An electrode which acts as the positive terminal of an electric discharge or which acts as the positive terminal of an electric field to cause a discharge or accelerate the electrons in an electric discharge.

ATTENUATOR

Devices and networks consisting of one or more elements which exhibit only a positive resistance effect and which reduce the intensity of the energy passing through the device by dissipation, (1) the elements being proportioned to permit a change in their value to control the energy loss while maintaining substantially constant input and/or output impedance of the device, and/or (2) the elements being proportioned to permit the device to be inserted in the circuit to provide an energy loss without introducing any reflections in the circuit, and/or (3) the elements being combined with a long line or long line element, and/or (4) the device or network having an impedance equal to the impedance of a specified long line, and/or (5) the device or network is claimed as being particularly modified for use over a frequency band so that its characteristics are particularly related to frequency.

AUXILIARY GRID

Any grid, of an electronic tube other than the signal input grid.

BALANCED CIRCUIT

A circuit having its conductors electrically symmetrical with respect to a reference potential plane (e.g., ground). The potential between the two sides and ground are equal and of opposite sign. For example, a horizontal two-wire line may be a balanced line. See Push-Pull Stage.

BASE ELECTRODE

See the definition of point contact or junction transistor above.

BIAS, BIAS VOLTAGE, BIAS CURRENT

In an amplifying device, usually, a steady D.C.. voltage or current applied between two electrodes usually referred to the input electrodes to form an electric reference means for the control means, which influences the current flow of an electronic tube or semiconductor device or the flux relationships of a magnetic saturable reactor. See also Bias Control and Power Supply.

BIAS CONTROL

Control, as defined above applied to control of bias voltage or current of an amplifying device. This is distinguished from signal feedback in that the bias control voltage or current has a smoothed average value which adds to or subtracts from the bias voltage or current and is unlike the signal feedback voltage which varies instantaneously with the signal at the point from which it is derived. See also, Bias, Bias Voltage or Bias Current.

CASCADE AMPLIFIER

A series of amplifiers wherein the input for each amplifier except the first (to which the electric signal source is connected) is coupled from the output of the prior amplifier.

CATHODE OR CATHODE ELECTRODE

The negative electrode of the two electrodes of an electronic tube between which an electric discharge occurs (for negative charge carrier particles); in a vacuum tube the electrode which emits the electrons and is negatively charged with respect to the electrode which collects the electrons.

CATHODE-HEATER

A filament in proximity to an indirectly heated cathode with terminals designed to receive a source of power to heat the cathode to its electron emitting temperature.

CATHODE IMPEDANCE

The impedance from the cathode of an electronic tube to ground or a reference potential.

CHARGE CARRIER PARTICLE

A charged particle of matter involved in a flow of space current (electric discharge) and by means of which such current flows (current flow other than an electromagnetic wave propagated in open or confined space). Such charge carrier particles may be ions of a gas or charged atomic particles such as electrons.

COLLECTOR ELECTRODE

See the definition of point contact or junction type transistor below.

COMPRESSOR OR VOLUME COMPRESSOR

A device that compresses the volume range, as in recording sound, radio-telephone transmission, etc.. In compressing the signal volume range the amplification of large signals is reduced and of small signals is increased.

CONFIGURATION

The arrangement of electrodes of a transistor as input and output electrodes, e.g., common base configuration, where the base is included in both the input and output circuits of a transistor amplifier.

CONTROL

A selective adjustment of an element of an amplifier to vary the operation of the amplifier in a desired manner, or the characteristic of a part of the amplifier whereby in response directly to signal, or by means of a developed voltage or current in response to the signal, or by a voltage from some outside source, the impedance characteristics of a circuit element, or the electrical characteristics (bias or energizing voltage) of an ampli-

fying device are automatically altered to change the operation of the amplifier in a predetermined manner. Such control may be by a nonlinear impedance element alone in a biasing or power supply circuit. The term control has not been applied in this class, when a nonlinear impedance element is in the signal path and affects the signal only, without any control from a separate path being applied to vary such impedance.

CONTROL ELECTRODE

An electrode designed to influence or control the discharge current flowing between other electrodes. It may depend for its effect on either its electrostatic effect or on the current flow thereto. The most common types of control electrodes are the signal control grid, or the gain control electrode or grid.

CONCENTRIC LINES

A transmission line in which one conductor extends within a second hollow conductor.

CONTROL GRID

A control electrode having grid construction.

D.C. COUPLING

A signal coupling network including a D.C.. conductive path. In a four terminal network such paths must be traced between terminals on the circuits to and from which the coupling is made which vary in voltage with the signal (this excludes D.C.. paths limited to ground leads or D.C.. shunt paths).

D.C. PATH OR D.C. CONDUCTIVE PATH

A path for current in a network which can conduct D.C.. current.

DELAY NETWORK

Networks including significant structure for retarding wave energy a predetermined period of time over a range of frequencies.

DIODE

Refers to any electronic tube, solid element, semiconductor, barrier layer device or other current carrier means limited to two electrodes and without additional magnetic or electrostatic means to influence the current flow, and which has marked unidirectional current characteristics.

DIRECTLY HEATED CATHODE OR FILAMENTARY CATHODE

A filament designed to have its terminals connected to a source of current, the filament being heated by the current passing through it and effective to emit electrons, designed to serve as a cathode of an electronic tube as defined above.

DISCHARGE PATH

The path of the free electrical charge carrier particles between the electrodes of an electronic tube.

DISTRIBUTED PARAMETER CHARACTERISTICS

A conductor or conductive means designed to operate at microwave or other high frequencies, so that the conductive means exhibits both distributed capacitance and distributed inductance at such frequencies.

DISTRIBUTED PARAMETERS

When the impedance of a transmission device or line at the operating frequency or band of frequencies is due primarily to the parameters of the device or line itself, and in considering the inductance, capacitance and resistance of the device or line they must be considered as mixed together and spread out along the device or line rather than being considered as in separate discrete lumps or devices as in the case of simple series and parallel circuits, the transmission device or line may be said to have distributed parameters. Examples of circuits with distributed parameters include telephone, telegraph and power lines for high frequency energy.

DONOR IMPURITY OR DONOR

A material which when added to a semiconductor in minute quantities, as an impurity, induces electron conduction, generally causing the semiconductor to become one of “N-type conductivity”.

ELECTRIC CARRIERS OF A TRANSISTOR

Current flow in a transistor may be by negative carriers (electrons) or positive carriers (holes).

ELECTRIC DISCHARGE

The flow of current between two spaced electrodes at

different potentials or the charge carrier particles conveying the current from one spaced electrode to the other.

ELECTRIC SIGNAL SOURCE OR SIGNAL SOURCE

The source of electrical signal energy to be amplified or the source of electrical signal energy which controls the electric power supply applied to the amplifying device.

ELECTRICAL CIRCUIT

An electrical network providing one or more closed paths.

ELECTRICAL NETWORK OR NETWORK

An arrangement of electrically connected electrical elements and/or devices which are capable of carrying electric A.C. or D.C. current. Note. A network does not define the structure in space of the network elements or their arrangement in space relative to each other; it merely defines the elements or devices broadly by type as to the electrical function they perform and the electrical connections which will carry current between such elements and/or devices.

ELECTRODE

(1) In a vacuum tube, electronic tube or in any discharge device, the conductive elements between which the electric discharge takes place, and to which the power supply is applied; any additional conductive means placed in proximity to the electric discharge and/or other electrodes to affect electrostatically the discharge or the potentials of the electrodes with which they are in proximity. (2) In a magnetic amplifying device or in a resistive amplifying device, (including semiconductive devices) the terminals of windings which influence the operation of the magnetic device or the resistor or semiconductor terminals by means of which electric current may flow in or out of the resistor or semiconductor or by means of which a potential may be applied to the resistor or semiconductor.

ELECTROMECHANICAL TRANSDUCER

Means to convert the electric signal to mechanical vibrations and means further to convert the mechanical vibrations back to electric signals, such means generally serving as either time or phase delay means or means to determine the transmission frequency of the coupling network.

ELECTRONIC TUBE

An electric space discharge device, that is, a device in which electricity flows from one electrode to another by means of free electrical charge carrier particles traveling in a vacuum, gas or vapor; included are electric space discharge devices (also called electronic tubes) which operate in the open, i.e., not in an enclosed envelope. The electrical charge carrier particles may be of any type, usually electrons for vacuum tubes or charged ions for gas or vapor tubes.

EMITTER ELECTRODE

See the definition of point contact or junction type transistor in this Glossary.

EQUALIZER

Networks with attenuation or attenuation and phase distortion characteristics which vary over a frequency range for use in a wave transmission system for modifying the attenuation or attenuation and phase characteristics of the wave energy as a function of frequency.

EXPANDER OR VOLUME EXPANDER

A device that expands the volume range, as in recording sound, radio-telephone transmission, etc. In expanding the signal volume range, the amplification of large signals is increased, and the amplification of small signals is reduced. Expanders are used generally to restore a signal after compression.

GRID

Is used in the conventional sense referring to the intended use and structure of the element in an electronic tube, particularly in a vacuum tube.

FILAMENT

A wire, ribbon, or rod conductive member.

FILTER

A frequency selective means.

FREQUENCY RESPONSIVE MEANS

Circuit means which acts on the signal to affect some frequency component of the signal differently from any other frequency components of the signal, for example,

a tuned circuit or filter circuit which eliminates a frequency component, or an equalizer which emphasizes the signal amplitude of some frequency or frequency range of the signal with respect to others (e.g., tone control). See also, Frequency Selective Means, below.

FREQUENCY SELECTIVE MEANS

Network means composed of some reactive elements which permit the passage of certain frequency components or a frequency component and block others. See also, Frequency Responsive Means.

GAIN

The ratio of the amplifier output power, voltage, or current to the amplifier input power, voltage or current.

GAIN CONTROL ELECTRODE

An electrode designed, together with the electron tube in which it is incorporated, to receive a D.C.. control voltage (other than the signal but which is usually derived from the signal), whereby changes in the control voltage change the gain of the tube.

GAS OR VAPOR TUBE

An electric discharge device which depends, for its operation, at least in part, upon ionization of a gas or vapor.

GRID OR GRID ELECTRODE

An electrode having one or more apertures therein, usually formed of open-work material such as wire mesh, etc.., and usually used as the signal or control electrode, or auxiliary electrode of an electron tube.

IMPEDANCE MATCHING NETWORK

Coupling networks which include one or more impedance elements construed or proportioned to substantially eliminate the reflected wave energy between the network and at least one of the connected circuits caused by impedance differences.

INDIRECTLY HEATED CATHODE (EQUIPTENTIAL CATHODE)

A cathode designed to be heated to its emitting temperature by a separate heating element.

INPUT CIRCUIT OR COUPLING

The circuit or network of an amplifier extending from the source of electrical signal to the input electrodes of the amplifier, which may include the source of electrical signal.

INTERELECTRODE CAPACITANCE

The capacitive reactance for signal flow between any two electrodes of a vacuum tube, transistor or similar device inherent in their relationship to each other electrostatically and which for certain frequencies and voltages forms a path for the signal current usually detrimental to the operation of the circuit.

INTERELECTRODE IMPEDANCE

An impedance between electrodes of a vacuum tube, transistor, or similar device inherent in its structure, and manner and frequency of operation. This term is generic to inter-electrode capacitance above; and includes also input conductance caused by the transit time of electrons, etc.

INTERSTAGE CIRCUIT OR COUPLING

The electrical circuit or network by means of which the output signal from the output electrodes of the amplifying device of one stage of a cascaded amplifier is conveyed to the input electrodes of the amplifying device of the following stage of the cascade amplifier.

INTRINSIC CONDUCTIVITY

Refers to a semiconductor material which for a certain range of conditions has its free electron carriers and free hole carriers in approximate balance, so that the semiconductor material is neither N- nor P-type. Sufficient change in temperature or sufficient radiant energy impinging upon such a body will upset this equilibrium.

JUNCTION IN A TRANSISTOR OR SEMI-CONDUCTOR

The boundary of P-type and N-type semiconductor material.

JUNCTION TRANSISTOR

A transistor comprising two P-N Junctions back-to-back wherein a region of P- or N-type semiconductor material is common to both junctions (thus determining an NPN or a PNP junction transistor, respectively); an emitter electrode connected to one of the conductivity

regions not common to the two junctions, normally forwardly biased (positive terminal of bias means to emitter for PNP type and negative terminal for NPN type); a collector electrode connected to the other conductivity region but common to the two junctions, reversely biased (negative terminal of bias means for the PNP type and positive terminal for the NPN type; and a base electrode connected to the region common to both junctions. See definition of Point Contact Transistor, which operates similarly in many respects.

LECHER LINES

A parallel transmission line with means to tune the parallel line.

LOAD

The electric device or circuit which utilizes the output signal derived from the amplifier after the input signal has controlled the electric power supply by means of the amplifying device to yield a signal which is a replica of the input signal but usually of greater amplitude.

LONG LINE

A wave transmission device or line having distributed parameters and especially designed to propagate electrical wave energy where the wave length of the transmitted energy is relatively short when compared with the length of the transmission line or device. The impedance of a long line is practically fixed by the constants of the line itself. The length of the transmission line or device may be a multiple or a fraction of a wave length, e.g., 1/4, 1/2, etc., or otherwise have its length proportioned to the wave length of the energy with which it is to be used.

LONG LINE ELEMENT

A circuit element having distributed parameters, such as a resonator, or a wave guide. A long line element may be a part of a long line wave transmission device or used in a network with other circuit elements of the lumped parameter type, for example, as in the case of delay networks, impedance matching networks, wave filters.

LOOP PATH

In an amplifier having signal feedback, the path of the signal from the input point where the signal feedback is applied forward through the amplifier to the point in the circuit from which the signal feedback is derived through the signal feedback path to the aforesaid input point.

MAJORITY CARRIERS

See the definition of N- or P-type conductivity below.

MINORITY CARRIERS

See the definition of N- or P-type conductivity below.

NEGATIVE FEEDBACK

Signal feedback having at least some component thereof in opposite phase with the signal at the point where the signal feedback is applied.

N-TYPE CONDUCTIVITY

The characteristic of a semiconductor material, usually imparted by the addition of impurities of the “donor” type, of an excess of free electrons over holes (free positive charges) at any time at room temperature, such negative charge carriers or electrons being referred to as majority carriers for current flow in such material, and holes as minority carriers for such current flow.

NEUTRALIZATION MEANS

Circuit means to eliminate, mitigate, or lessen undesirable effects of inter-electrode capacitance or inter-electrode impedance and which may include the input and/or output impedance of the amplifying device involved (such input or output impedance includes the inter-electrode impedance of the input or output electrodes).

NONLINEAR IMPEDANCE OR DEVICE

An impedance or device, which may be reactive or resistive or a combination of both and having the characteristic that for changes in voltage or current, the relationship of the voltage drop across the impedance or device, or the voltage applied across the impedance or device to the current flowing through it, is nonlinear.

OUTPUT CIRCUIT OR COUPLING

The circuit or network of an amplifier extending from the output electrodes of the amplifier to the load device, which may include the load.

PARASITIC REACTANCE, IMPEDANCE, CAPACITANCE, OR INDUCTANCE

Impedance characteristics of capacitive or inductive nature which are exhibited by conductive elements or conductive parts of a circuit at only high frequencies in a circuit designed for operation over a wide band and are inherent in the construction of such element or part. The presence of such reactances is undesirable and generally detrimental to the proper operation of the circuit. When a parasitic reactance is used as though it were a predetermined lumped reactance as in the case of the distributed capacitance of a coil being used to resonate therewith at a particular frequency; the distributed capacitance or other parasitic reactance is treated, for classification purposes, as though it were a predetermined lumped reactance in the circuit. Inter-electrode capacitances similarly involved in amplifiers as part of a tuned circuit are similarly treated.

PASSIVE NETWORK

A network containing no source of energy and in which no energy is dissipated other than that accounted for by the resistance of the components of the network.

PHASE SHIFT

Used to designate the change in phase relation between voltage and current of the same wave energy, or between the voltages or the currents of different wave energy of the same frequency.

POSITIVE FEEDBACK

Signal feedback having at least some component thereof in phase with the signal at the point in the amplifier circuit where the signal feedback is applied.

POTENTIOMETER

A network which permits the division of a voltage applied across it, including adjustable means to select a particular division of the voltage applied across the network.

POWER SUPPLY

The source of electrical energy applied to an amplifying device which is controlled by the electric input signal. The term is used herein generically to include also a cathode heater supply, and bias voltage or current supply.

PLURAL AMPLIFIER CHANNELS

An amplifier system having at least two signal channels each containing separate amplifiers as defined above (wherein each amplifier may be a cascade amplifier), such amplifier channels may be completely separate from each other having separate and independent sources or loads; usually with some common control or they may be in parallel, having a common source and a common load; or the plural channels may be in branched circuits from separate sources or to separate loads.

POINT CONTACT TRANSISTOR

A transistor comprising a body of P- or N-type semiconductor material to which are attached two closely spaced electrodes connected at sharply defined points to the semiconductor material and a third electrode, the base relatively remote from the other electrodes and having a relatively large contact area (low resistance) for connection to the semiconductor. In this type of transistor the emitter is forwardly biased having, in N-type semiconductor material, the positive terminal of the biasing means connected to the emitter electrode, and for P-type semiconductor material the negative terminal of the biasing means connected to the emitter relative to the base, to inject minority carriers for the conductivity type semiconductor material (holes for N-type and electrons for the P-type) and the collector is biased reversely (having the negative terminal of the biasing means connected to the collector for N-type material and the positive terminal for P-type material), relative to the base so that minority carriers are collected there.

P-TYPE CONDUCTIVITY

The characteristic of a semiconductor material, usually imparted by “acceptor” type impurities therein, of an excess of free positive carriers (holes) over free negative carriers (electrons), such positive carriers or holes being referred to as majority carriers for current flow in such material and the electrons as minority carriers for such current flow.

PUSH-PULL STAGE

Includes two amplifiers each as defined above under “AMPLIFIER”, the input electrodes of each of the amplifying devices of the two amplifiers being balanced to ground or some other convenient electrical reference plane, the source of electrical signal being such, and so coupled to the input electrodes, that at any instant the signal on each input electrode is substantially equal and opposite in sign to the signal on the other input elec-

trode; and wherein the signal on the output electrodes of each of the amplifying devices is similarly balanced to a convenient electrical reference plane.

(1) Note. A balanced signal circuit is treated in this class as a special case of a single source or a single load. See Balanced Circuit.

(2) Note. A push-pull amplifier is treated in this class as a single channel, having a single source and a single load.

REACTIVE COUPLING

A coupling network including reactive means which may be inductive or capacitive.

RECTIFIER

A device with a unilateral current characteristic which permits the passage of only D.C. current therethrough, and which is used to convert A.C. current applied thereto to D.C. current.

RESONANT CIRCUIT

A circuit containing both inductive and capacitive reactance and in which the inductive reactance equals the capacitive reactance for a particular frequency. The resonant circuit may be series resonant, where the reactive elements are in series; or parallel (anti-resonant), where the inductive and capacitive elements are in parallel. See also, Resonator.

RESONATOR

Devices comprising conductive enclosures, cavities, or wave transmission line sections of the two terminal type, and having distributed inductance and capacitance, the line sections being terminated in other than the characteristic impedance of the line sections, the devices presenting resonant characteristics to the existing source of wave energy. See also Resonant Circuit.

SATURABLE REACTOR

An inductive device having a core and at least one winding thereon in which the inductance is variable in accordance with magnetomotive force applied, up to a limiting value beyond which increased magnetomotive force does not change the inductance.

SCREEN GRID

A grid electrode placed between the control grid and the anode of a vacuum tube to reduce inter-electrode capacitance.

SECONDARY EMISSION ELECTRONIC OR VACUUM TUBE

A tube which depends for its operation, at least in part, upon the emission of electrons from a body due to collision of higher energy electrons with the body.

SECONDARY EMISSIVE ELECTRODE

An electrode which emits electrons upon collision with higher energy electrons. Since all electrodes have this characteristic, the term applies only to those electrodes designed to have an electron stream or beam impinge thereon to emit a stream or beam of secondary electrons.

SEMICONDUCTOR

A material having a specific resistance value of the order of that of germanium, silicon, selenium, etc.; or insulators whose specific resistance is reduced in value to the aforesaid range in operation, by alpha particle or electron bombardment or other means, so that the insulators operate broadly as semiconductors in an electrical circuit.

SEMICONDUCTOR AMPLIFYING DEVICE

An amplifying device constructed of a semiconductor with suitable electrodes for the application of signal current, power supply energy, and for the derivation of output signal current.

SIGNAL

A variable electrical current or voltage having characteristic variations in time, which characteristic variations are transmitted through an electrical network from a source in which the signal originates to a load where the signal is utilized.

SIGNAL ELECTRODE OR SIGNAL GRID

The electrode to which the signal is applied; in the case where such electrode is a grid electrode, the signal grid.

SIGNAL FEEDBACK

The application of a signal derived from an output electrode, to an input electrode of an amplifier or a prior

stage of an amplifier. The input and output electrodes of the feedback may be the same or a common electrode as where vacuum tube space current flows through an unbypassed cathode impedance to change the potential on the cathode with respect to the control grid in accordance with the signal output. (For the distinction between signal feedback and bias control see the definition thereof, above).

SIGNAL FEEDBACK PATH

Circuit means to apply a portion of the electrical signal output of an amplifier to the input of the amplifier involving a shared impedance for the input and output circuits.

STABILIZATION MEANS

In an amplifier having a tendency to depart from a predetermined condition of operation, any circuit means used to maintain such predetermined condition of operation of the amplifier. See the definition of Control above.

STRUCTURE

Refers to any details of a circuit element as to the nature or composition of the material or materials of which it is made, the form or shape of the element or its parts or the relationship in space of such elements or parts or such characteristics of the elements relative to each other.

SWITCH

A device or means for opening or closing an electric circuit.

THERMALLY RESPONSIVE IMPEDANCE

An impedance element whose impedance value is responsive to the temperature changes therein by reason of the heat generated by the current flow therethrough, or the ambient temperature of the impedance element, or whose impedance value may be changed by separate electrical control means or other heat control means.

TRANSISTOR

An amplifying device comprising a semiconductor material to which contact is made by three or more electrodes.

UNBALANCED CIRCUIT

A circuit having its conductors electrically unsymmetrical with reference to a potential plane. For example, a concentric line is ordinarily unbalanced, the outer conductor being ordinarily connected to ground.

VACUUM TUBE

An enclosed space evacuated of most of its gas wherein an electric discharge takes place between two electrodes one of which emits electrically charged atomic particles, generally electrons and the other electrode collects such particles. The vacuum tube has at least one additional electrode or other means to control the flow of charged atomic particles between the emitter electrode and the collector electrode. The electric discharge of a vacuum tube is normally an electron discharge and any discharge of ionized particles is normally fortuitous and unintended. A vacuum tube is usually involved in a four terminal network, the input signal being supplied to two input electrodes usually the grid (control) and cathode (electron emitting electrode) and the output circuit normally being comprised of the power supply, the anode load impedance, the anode, the electron discharge, the cathode impedance, the load and the output coupling means. Thus the cathode which is normally present in the output and input circuits is normally the common electrode. Other alternative configurations where the input and output electrodes are not as above, as for example, where the anode is a common electrode and the cathode is the output electrode, are known and provided for in the schedule of this class. The terms for the grid, cathode and anode electrodes or auxiliary electrodes (as defined below) are referred to according to the predetermined use usually assigned for them regardless of the alternative circuit arrangements involved. The terms input, output, and common electrodes are used as in these definitions.

WAVE ENERGY

An undulatory disturbance propagated through a medium, (usually periodic in nature), its displacement varying periodically with respect to time or distance or both. The wave may be manifested in electrical, mechanical or acoustical form. However, in this class the term “wave energy” refers only to electrical wave energy.

WAVE GUIDE

A transmission device designed to propagate electrical waves having an electric or magnetic field component extending in the direction of propagation. The wave

guide may be a hollow dielectric or metal tube, or a solid dielectric rod, the wave energy being propagated along the interior of the tube or rod and confined by the walls of the tube or rod.

WAVE TRANSMISSION DEVICE

Any device which is used to guide or constrain electrical wave energy and to convey the energy from one place to another. Included are conductors, wave guides, resonant structures (e.g., cavities, etc.).

SUBCLASSES

1 This subclass is indented under the class definition. Subject matter wherein the amplifier is combined with other devices or structures having an added purpose or independent utility, other than to perfect the amplifier, and in which the utility of the art device is not destroyed by removal of the amplifier and which combination is not provided for elsewhere.

(1) Note. An example of art classifiable in this class and subclass is an amplifier combined with an automobile accelerator pedal to control the volume of the amplifier. The removal of the amplifier does not destroy the utility of the accelerator pedal (as it would in case of a radio receiver which included the amplifier or a part thereof).

(2) Note. Subject matter in which a source is claimed by name only as a specific art device, as for example, a microphone, is classified with the specific art device and not with amplifiers. Subject matter, in which the signal source device may be broadly claimed, not by name, but by some distinctive identifying feature thereof as, where a microphone source is claimed as a "means for converting sound signals", is not classified with amplifiers, but with the distinctive art device.

(3) Note. The terms generator or oscillator in claims, where they appear as sources of signal energy without further qualification except by their electrical characteristics such as impedance, reactance, etc., are treated as generalized sources of signal energy and classification is with amplifiers except where specific details of the generator or oscillator are claimed; in such cases, classification is with the type of generator claimed or with oscillators in Class 331.

(4) Note. Where the load is claimed, even broadly, or by name only as a specific electrical art device, as for example, a loudspeaker, classification is not in this class, but with the load art device claimed. Where characteristics of the load device are claimed, which are peculiar to the disclosed electrical art device or to a specific type of electrical art device, classification is with the load art device established in the claim.

(5) Note. Subject matter wherein general electrical characteristics of the load are claimed, as for example, "a load having a variable impedance", is classified in this class.

2 This subclass is indented under the class definition. Subject matter involving means or methods of testing amplifiers as set forth in the class definition and/or amplifiers as set forth in the class definition combined with indicating means to show a condition of the amplifier.

(1) Note. Amplifiers combined with a meter or indicating means not involving a condition of the amplifier but where the amplifier is merely an instrument in facilitating such indication, are not classified in this class and subclass but in the appropriate subclass of Class 324, Electricity: Measuring and Testing or Class 340, Communications: Electrical, unless they are specialized for use in the testing of a specific electronic art device in which case, classification is generally with the specific electrical art device.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, appropriate subclasses for electrical measuring and testing. See (1) Note, above.

340, Communications: Electrical, appropriate subclasses for systems with sig-

nal or alarm indicating means particularly subclasses 500+. See (1) Note, above.

3 This subclass is indented under the class definition. Subject matter including at least two amplifying devices each of which is of a type different from the other.

(1) Note. When each of the amplifying devices is of a type which is classified in different subclasses of this class providing for such different types of amplifying devices, such as subclass 8 for saturable reactor type and subclass 44 for electron beam type, classification is in this subclass. Where the different types of amplifying devices are types provided for in coordinate subclasses indented under a major genus type, classification is not in this subclass, but in the appropriate subclasses indented under subclass 250. Diverse type vacuum tube amplifying devices combined in an amplifier are classified in subclass 3 when each of the diverse type amplifying devices is of a type separately provided for by a subclass in this class, as for example, a traveling wave type amplifier classified in subclass 43 and an electron beam tube amplifying device classified in subclasses 44+. Where different types of vacuum tubes are involved, only one of which is provided for by a separate subclass, classification is not in subclass 3 but in the subclass providing for an amplifier having an amplifier device of that type. Combinations of vacuum tube and gaseous tube amplifiers are classified herein. Diode vacuum tube amplifiers combined with any other type of vacuum tube amplifier, whether provided for as a separate subclass or not, are classified herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

150, for cascaded vacuum tube amplifiers with amplifier devices having different characteristics (both amplifying devices being of the same general type).

299+, for transistor amplifiers including combined diverse type semiconductors.

310, for plural cascaded stage transistor amplifiers including transistors having different characteristics.

4 This subclass is indented under the class definition. Subject matter wherein the amplifying device combines (1) a substance having the characteristic that certain molecular, atomic, or nuclear particles thereof are capable of excitation to a higher energy level; (2) means to raise such particles to the higher energy level state; (3) means for applying an electrical signal to the amplifying device; and (4) means for securing the amplified output therefrom, whereby the aforementioned excited particles in undergoing a change from the higher to a lower energy state emit radiation which is released by the applied electrical signal, thereby to amplify it.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclass 251 for devices for producing and propagating a unidirectional stream of neutral molecules or atoms through a vacuum, usually at thermal velocity and including means to excite the molecules or atoms at a resonant frequency.

324, Electricity: Measuring and Testing, subclasses 300+ for electrical measuring and testing means involving nuclear induction, which refers to operation on a nuclear resonant principle similar to that employed in masers.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous circuits which may utilize a maser type circuit.

331, Oscillators, subclass 94.1 for oscillators of the molecular or particle resonant type, e.g., maser type.

332, Modulators, appropriate subclasses for modulators of the molecular or particle resonant type, e.g., maser type.

333, Wave Transmission Lines and Networks, subclass 24 for gyrator type wave transmission coupling means,

including devices operating on a molecular or nuclear resonant principle similar to that employed in masers.

359, Optics: Systems (Including Communication) and Elements, subclasses 333+ for optical or quasi-optical maser-type amplifying devices.

4.5 This subclass is indented under the class definition. Subject matter including (1) a nonlinear reactance, (2) means for applying an input signal frequency to said nonlinear reactance, (3) means for effectively applying a pumping frequency higher than said signal frequency to said nonlinear reactance, and (4) means for abstracting the amplified output therefrom, whereby sum and difference frequencies are produced, one or both of which (but usually the difference frequency [called the idler frequency] reacting with the pumping frequency to produce energy at the signal frequency which is combined in phase with the input signal.

(1) Note. While the pumping frequency is higher than the signal frequency, the pumping frequency may be derived from a lower frequency source, for example, as a harmonic of the lower frequency source.

SEE OR SEARCH THIS CLASS, SUBCLASS:

7, for an amplifier with a capacitive amplifying device.

8, for an amplifier with a saturable reactor type amplifying device.

53+, for an amplifier with a distributed parameter coupling means.

4.6 This subclass is indented under subclass 4.5. Subject matter including structure for propagating energy of the various frequencies in interacting relationship with the nonlinear reactance.

SEE OR SEARCH THIS CLASS, SUBCLASS:

4, for maser type amplifying devices.

5, for solid element wave propagating devices generally.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnections Systems, subclass 424 for nonoptical parametric amplifier frequency converters, per se.

332, Modulators, subclasses 117+ or 144+ for capacitive frequency or phase modulators, respectively, and subclass 173 for magnetic amplitude modulators.

333, Wave, Transmission Lines and Networks, subclasses 138+, for delay networks.

359, Optics: Systems (Including Communication) and Elements, subclasses 326+ for parametric optical frequency translators.

455, Telecommunications, subclasses 313+ for receivers with frequency modification or conversion which may use parametric-type means; and subclass 336 for superrangenerative receivers.

4.7 This subclass is indented under subclass 4.6. Subject matter wherein the propagating structure is an electron beam device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

43+, for travelling wave amplifiers.

SEE OR SEARCH CLASS:

315, Electric Lamp and Discharge Devices: Systems, subclasses 3.5+ and 39.3, for miscellaneous travelling wave tube systems.

4.8 This subclass is indented under subclass 4.5. Subject matter wherein the nonlinear reactance is of the gyromagnetic type.

(1) Note. The term “gyromagnetic” as applied to material designates magnetically polarized material (e.g., ferrites, garnets, and ionized gases) having unpaired spin systems which exhibit significant precessional motion in an orthogonal R.F. field.

SEE OR SEARCH THIS CLASS, SUBCLASS:

4.6, for travelling wave type amplifiers involving gyromagnetic nonlinear reactance.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 1.1 and 24.1+, for gyromagnetic plural channel systems and coupling networks respectively.

4.9 This subclass is indented under subclass 4.5. Subject matter wherein the nonlinear reactance is of the semiconductor type (e.g., a diode).

SEE OR SEARCH THIS CLASS, SUBCLASS:

4.6, for travelling wave type parametric amplifiers whose nonlinear reactance is of the semiconductor type.

250+, for semiconductor amplifiers generally.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous nonlinear circuits.

5 This subclass is indented under the class definition. Subject matter wherein the amplifying device comprises a solid-state element wave propagating means having associated means, such as a distributed parameter network, for coupling a signal wave to be amplified to the wave propagating means.

SEE OR SEARCH THIS CLASS, SUBCLASS:

4+, for amplifiers having amplifying devices of the maser type including those with solid element wave propagating means.

4.6, for travelling wave type parametric amplifiers which may utilize solid-state wave propagating means.

43, for traveling wave tube amplifiers.

45, for amplifiers having amplifier devices of the electron beam type which include an electrode coupled to a cavity resonator.

53+, for amplifiers with distributed parameter type coupling.

250+, for amplifiers having amplifying devices of the semiconductive type.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous circuits which may include subject matter similar to the amplifiers classified in this subclass.

331, Oscillators, subclass 94.1 for oscillators of the laser type which may include solid element wave propagating means.

332, Modulators, appropriate subclasses for modulators of the laser type which may include solid element wave propagating means.

333, Wave Transmission Lines and Networks, appropriate subclasses, particularly subclass 24 for distributed parameter transmission coupling means including coupling means involving solid element wave propagating means.

372, Coherent Light Generators, appropriate subclasses for laser type oscillators.

5.5 This subclass is indented under subclass 5. Subject matter wherein the solid-state means is adapted to propagate and amplify signal waves in the form of acoustic, ultrasonic or hypersonic elastic waves of the phonon type.

SEE OR SEARCH CLASS:

181, Acoustics, subclass .5 for mechanical travelling wave structures for propagating acoustic wave.

307, Electrical Transmission or Interconnection Systems, subclass 424 for nonoptical parametric amplifier frequency converters which may employ acoustic waves (e.g., Raman or Brillcuin devices).

310, Electrical Generator or Motor Structure, subclasses 311+ piezoelectric devices in general which may propagate elastic waves of the phonon type.

333, Wave Transmission Lines and Networks, subclasses 138+ for wave delay networks and subclasses 187+

for wave filters utilizing piezoelelectric wave propagating elements.

359, Optics: Systems (Including Communication) and Elements, subclasses 326+ for parametric optical frequency translators.

367, Communications, Electrical: Acoustic Wave Systems and Devices, for compressional wave systems or transducers which may employ solid element wave propagating devices of the sonic or supersonic type.

6 This subclass is indented under the class definition. Subject matter wherein the amplifier includes means for applying or varying a magnetic field, and an electrical resistor subjected to such field or varying field in such manner that the value of the resistance transverse to the magnetic field changes, thus comprising a Hall Effect Device; such Hall Effect Device may comprise the amplifying device, per se, or may be included as a unilateralizing means (gyrator) to insure unilateral operation of the amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

8, for amplifiers having saturable reactor amplifying devices.

60, for amplifiers having magnetostrictive means in the amplifying device.

62, for amplifiers having a magnetoresistive type amplifying device.

63, for amplifiers having a magnetic means type amplifying device not elsewhere provided for.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 511 for miscellaneous circuits utilizing a Hall effect type element.

329, Demodulators, appropriate subclasses for demodulators including a Hall effect element.

333, Wave Transmission Lines and Networks, subclass 24 for Hall effect type gyrators, and subclasses 213+ for two terminal negative resistance networks.

338, Electrical Resistors, subclass 32 for electrical resistors whose resistance value changes in response to a magnetic field including resistors responding in accordance with the Hall effect.

7 This subclass is indented under the class definition. Subject matter wherein the amplifying device is a nonlinear capacitor.

(1) Note. A nonlinear capacitor is one in which for any frequency, the ratio of the voltage across the capacitor to the current flowing through it, is not linear.

(2) Note. To be classified in this class the output signal must be a substantial replica of the input signal. Subject matter involving nonlinear capacitors in which the power supply, which is controlled by the signal, is A.C. must include filter means claimed to eliminate the A.C. power supply from the output signal or classification is in Class 307, Electrical Transmission or Interconnection Systems, subclasses 40+. However subject matter involving nonlinear capacitor amplifying devices wherein an A.C., power supply is used and claiming a demodulator will be classified herein even where the output filter is not claimed, if the filter is disclosed. It will be assumed to be part of the claimed demodulator.

SEE OR SEARCH THIS CLASS, SUBCLASS:

8, for amplifiers having saturable reactor type amplifying devices.

10, for amplifiers of the modulator-demodulator type.

86, for signal feedback amplifiers with variable impedance controlled by a separate path.

95, and 110, for signal feedback amplifiers with nonlinear impedance means.

143, for amplifiers having a thermally responsive impedance.

144+, for amplifiers having a variable impedance for the signal channel controlled by a separate control path.

164, for amplifiers having an electronic tube or diode in an interstage coupling means.

174, for amplifiers having an electromechanical transducer (e.g., piezoelectric

crystal) in an interstage coupling means.

183, for amplifiers having a nonlinear device in an interstage D.C. coupling means.

250+, for amplifiers having semiconductor type amplifying devices, particularly subclass 287.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclasses 401+ for nonlinear reactor systems.

361, Electricity: Electrical Systems and Devices, subclasses 271+ and 500+ for capacitors, per se.

8 This subclass is indented under the class definition. Subject matter wherein the amplifying device is a saturable magnetic core with at least means to apply an electrical signal and an A.C. power supply to at least one winding thereon; the input signal which may be D.C. or A.C. is applied to the signal winding to control an A.C. power supply applied to the power winding, which may be the same winding or a different winding.

(1) Note. To be classified in this class the signal output of the amplifier must be a substantial replica of the input signal. Therefore subject matter involving saturable reactors without filter means is not classified in this class with amplifiers, but is classified elsewhere. See the SEarch Class: notes below. Subject matter involving saturable reactors claiming a "demodulator" and disclosing a filter therewith but not claiming the filter are assumed to claim the filter as part of the demodulator and are classified herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

7, for amplifiers having capacitive type amplifying devices including "saturable capacitive reactor" means.

10, for modulator-demodulator type amplifiers.

60, for amplifiers having magnetostrictive means.

62, for amplifiers having magnetoresistive type amplifying devices.

63, for amplifiers having magnetic means amplifying devices.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclasses 416+ for amplifiers using nonlinear reactors with a nonlinear output signal.

323, Electricity: Power Supply or Regulation Systems, subclasses 249, 302, 310, and 329 for saturable inductive reactor circuits to control voltage magnitude. See (1) Note above.

336, Inductor Devices, subclasses 155+ for the structure of saturable inductive regulators of the static type.

361, Electricity: Electrical Systems and Devices, subclass 204 for saturable reactors with electric relay or electromagnet load.

9 This subclass is indented under the class definition. Subject matter including a periodic switching means common to the input and output circuits of the amplifier.

(1) Note. This subclass includes essentially four types of subject matter containing a periodic switch, as follows:

(a)Where the signal is chopped to get A.C. which is fed to the amplifier and the amplifier output is chopped to get a D.C. output (this subject matter is the same as is classified in subclass 10 below except that the modulator and demodulator are of the chopper type).

(b)The signal to the main amplifier is not chopped but a portion to another amplifier is combined with a signal from the output of the first amplifier and the two are chopped to get an A.C. signal which is used to develop a corrective signal for the main amplifier.

(c)The input is compared to the output by a periodic switch to develop a correction signal, generally for drift correction.

(d)The input and output signal are combined and then chopped and put into the main amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

83, for push-pull signal feedback amplifiers having a D.C. feedback path.

97, for signal feedback amplifiers having a D.C. feedback path.

121, for push-pull amplifiers having D.C. interstage coupling.

125, for plural amplifiers having a D.C. and an A.C. channel.

159, 161, 163, and 181+, for D.C. coupling involved in the interstage coupling.

187, and 191, for D.C. input coupling.

194, and 198, for D.C. output coupling.

10 This subclass is indented under the class definition. Subject matter including means for modulating the signal, which is usually D.C. or low frequency A.C. amplifying means, and means to restore the original signal, eliminating any carrier frequency components.

(1) Note. The means for eliminating the carrier need not be specifically claimed to be classified in this class if such means are disclosed. As for example, where a demodulator is claimed alone, and a filter means to eliminate the carrier is disclosed the filter need not be claimed for classification herein. The claimed demodulator will be assumed to include the filter in such cases.

(2) Note. Where the modulator and demodulator are of the chopper type see the search notes below.

(3) Note. Including in the "means for modulating the signal" are chopper means to convert the signal to pulsating direct current or alternating current.

SEE OR SEARCH THIS CLASS, SUBCLASS:

7, for amplifiers having a capacitive type amplifying device including those which modulate and demodulate the signal.

8, for amplifiers having saturable reactor type amplifying devices including those which modulate and demodulate the signal.

9, for modulator and demodulator of the chopper type.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclass 118, for measuring systems involving modulation-demodulation.

329, Demodulators, appropriate subclasses, for demodulator circuits.

332, Modulators, appropriate subclasses, for modulator circuits.

11 This subclass is indented under the class definition. Subject matter including means to restore a D.C. component to the signal, usually by means of a D.C. bias source and a rectifier circuit supplied to the control grid.

SEE OR SEARCH THIS CLASS, SUBCLASS:

140, for control of the input or gain control electrode including a rectifier in the bias circuit.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 306+ for miscellaneous circuits with amplitude control means.

348, Television, subclasses 691+ for television systems including D.C. reinsertion circuits.

41 This subclass is indented under the class definition. Subject matter wherein the amplifying device includes electrodes in a gas or vapor medium and which device depends upon ionization of a gas or vapor for its operation.

SEE OR SEARCH CLASS:

313, Electric Lamp and Discharge Devices, appropriate subclasses, particularly subclasses 161, 163, and 567+ for gas or vapor tubes, per se.

315, Electric Lamp and Discharge Devices: Systems, appropriate subclasses, for circuits including gas or vapor tubes as the ultimate load device.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous electronic tube circuits includ-

ing gas or vapor tubes with a control electrode, controlled in operation.

42 This subclass is indented under the class definition. Subject matter wherein the amplifying device is a vacuum tube including a secondary electron emissive electrode.

SEE OR SEARCH CLASS:
313, Electric Lamp and Discharge Devices, subclasses 103+, 377, 379, 399+, and 532+ for vacuum tubes, per se, having secondary emissive electrode.
315, Electric Lamp and Discharge Devices, Systems subclasses 5.11+, 11, 12.1, 39.63 for circuits including vacuum tubes as load devices having a secondary emissive electrode.

43 This subclass is indented under the class definition. Subject matter wherein the amplifying device is of the vacuum tube type including means for generating an electron stream or beam, and having additional means therein for propagating an electromagnetic wave or component thereof at a velocity reduced from the free space velocity of the wave and propagated in proximity of the electron stream or beam, permitting exchange of energy between the electrons and the electromagnetic wave.

SEE OR SEARCH THIS CLASS, SUBCLASS:
5, for amplifiers having a solid element wave propagating amplifying device.

SEE OR SEARCH CLASS:
315, Electric Lamp and Discharge Devices, Systems, subclasses 3.5+ and 39.3 for traveling wave type tubes involved as the load device in miscellaneous circuits. See the search notes under subclasses 3.5 and 39.3.
331, Oscillators, subclass 82 for traveling wave tube type oscillators.

44 This subclass is indented under the class definition. Subject matter wherein the amplifying device is a vacuum tube provided with means to form the electric space discharge into a restricted beam or ray, usually pencil-like.

(1) Note. Means to control the electron trajectory of the electrons emitted from the cathode (as in magnetrons which are classified below) is not regarded as an electron beam forming means required for classification in this and indented subclasses.

(2) Note. Subject matter broadly claiming so-called "beam power tubes" are not classified in this subclass but are classified below in the appropriate subclass for the circuit involved.

SEE OR SEARCH THIS CLASS, SUBCLASS:
42, for amplifiers having secondary electron emission tube amplifying devices.
43, for amplifiers having traveling wave type amplifying devices.
47, for magnetrons.
308, for amplifiers including an electron beam forming means and a semiconductor element as a target means therein.

SEE OR SEARCH CLASS:
313, Electric Lamp and Discharge Devices, subclasses 364+ for cathode-ray tubes, per se. See the search notes of Class 313.
315, Electric Lamp and Discharge Devices: Systems, subclasses 1+ for cathode-ray tubes with means to supply electric current or potential thereto and/or cathode ray tubes structurally combined with a circuit element. See the search notes of Class 315.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 600 for miscellaneous circuits having a particular beam tube structure.
329, Demodulators, appropriate subclasses and particularly subclass 368 for an amplitude demodulator employing an electron discharge device of three or more electrodes.

45 This subclass is indented under subclass 44. Subject matter wherein at least one electrode is coupled to a cavity resonator.

SEE OR SEARCH THIS CLASS, SUBCLASS:

49, for amplifiers having vacuum tube amplifying devices with distributed parameter characteristics.

56, for amplifiers with cavity resonator coupling means generally.

SEE OR SEARCH CLASS:

331, Oscillators, subclass 83 for multicavity beam tube (Klystron) oscillators.

46 This subclass is indented under subclass 44. Subject matter including means to deflect the electron beam.

SEE OR SEARCH THIS CLASS, SUBCLASS:

41, for amplifiers having gas or vapor tube amplifying devices including those having means to deflect the ionized gas or vapor stream.

65, for amplifiers including vacuum tube amplifying devices having distinctive structural characteristics or specific structural details not elsewhere provided for in the schedule.

SEE OR SEARCH CLASS:

313, Electric Lamp and Discharge Devices, subclasses 421+ for cathode-ray tubes, per se, having electron stream or beam deflecting means.

315, Electric Lamp and Discharge Devices: Systems, subclasses 364+ for cathode-ray tubes with means for deflecting the cathode ray.

47 This subclass is indented under the class definition. Subject matter wherein the amplifying device is of the vacuum tube type including means for magnetically influencing the electric discharge in the device, and not provided for above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

41, for amplifiers having a gas or vapor type amplifying device including those with magnetic means to deflect the ionized stream of gas or vapor particles.

42, for amplifiers having secondary emission tube amplifying devices including those with magnetic means.

43, for traveling wave type tube amplifiers which may include magnetic means.

44+, for electron beam tube amplifying devices which may include magnetic means.

SEE OR SEARCH CLASS:

313, Electric Lamp and Discharge Devices, subclasses 153+ for discharge device combined with a magnetic device. See the Notes and search notes of Class 313.

315, Electric Lamp and Discharge Devices: Systems, subclasses 39.51+ for magnetrons. See the Notes and search Notes and search Notes of Class 315.

329, Demodulators, subclass 322 for a magnetron type frequency modulator and subclass 354 for a magnetron type amplitude modulator.

331, Oscillators, subclasses 86+ for magnetron oscillators.

48 This subclass is indented under subclass 47. Subject matter wherein the input signal is coupled to the means for magnetically influencing the electric discharge.

49 This subclass is indented under the class definition. Subject matter wherein the amplifying device is of the vacuum tube type and includes within the vacuum tube an electrode or other element having distributed parameter impedance characteristics.

(1) Note. Distributed parameter characteristics as used in the definition above include long lines and long line elements such as lecher lines, parallel transmission lines in general, concentric lines, wave guides, cavity resonators, tuned transmission lines, etc., which possess distributed capacitance and inductance. For the definition of such means, see the class definition for Class 333, Wave Transmission Lines and Networks. Inherent capacity or inductance as for example between electrodes or of a lead inside the tube when made use of as a

lumped reactance circuit element is classified in the appropriate subclass involving the circuit; neutralization by feedback is classified in subclasses 76+ below.

SEE OR SEARCH THIS CLASS, SUBCLASS:

4, for amplifiers having a maser type amplifying device which may include distributed parameter impedance structure.

5, for amplifiers having a solid element wave propagating amplifier device.

43, for amplifiers including traveling wave tubes.

45, for amplifiers of the type having an electron beam tube amplifying device with an electrode coupled to a cavity resonator.

53+, for amplifiers with distributed parameter type coupling. See the search notes thereunder.

SEE OR SEARCH CLASS:

315, Electric Lamp and Discharge Devices: Systems, subclasses 39+ for a vacuum tube combined with distributed parameter type transmission means structure, with the tube as the load device. See the notes and search notes thereunder.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 593 for miscellaneous circuits with distributed parameters.

359, Optics: Systems (Including Communication) and Elements, subclasses 333+ for laser amplifiers.

50 This subclass is indented under the class definition. Subject matter including in addition to the amplifying device of the vacuum tube type, a similar vacuum tube, with the cathode unheated, so that the additional tube does not serve as an active element but merely presents impedance relations in the circuit similar to those of the amplifying device vacuum tube, usually for neutralizing the effects of the amplifying device interelectrode impedances.

SEE OR SEARCH THIS CLASS, SUBCLASS:

76+, for amplifiers having signal feedback means to compensate for inter-electrode impedance. See the notes and search notes thereunder.

51 This subclass is indented under the class definition. Subject matter combined with switch means, which may be of the electromechanical or electronic tube type (vacuum, gas, or vapor tubes), to disable or discontinue the operation of the amplifier automatically in response to a predetermined condition.

(1) Note. Miscellaneous gating circuits are classified in Class 327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 365+ unless significant details of an amplifier as classified in the class definition of this class are claimed when classification is in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

65+, for specific structure involved in the amplifier including structure involving switching means.

127+, for amplifiers having means to control power supply or bias voltage.

SEE OR SEARCH CLASS:

200, Electricity: Circuit Makers and Breakers, appropriate subclasses, for switches, per se.

307, Electrical Transmission or Interconnection Systems, subclasses 112+ for electrical transmission or interconnection switching systems.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 365+ for miscellaneous gating circuits.

361, Electricity: Electrical Systems and Devices, subclasses 1+ for electrical systems and devices with safety and protection means including those involving disabling switching means; subclasses 139+ for circuits for electric relays.

52 This subclass is indented under the class definition. Subject matter including means for control of the amplifier which may be for control of the bias of an amplifier device electrode or of a variable impedance for the signal channel, wherein the signal input includes a component of a particular frequency not involved in the signal for signal purpose, which is selected by a means in or associated with the amplifier and applied to the control means or used to develop a control voltage applied to the control means.

(1) Note. See the class definition, Lines With Other Classes and Within This Class, for other systems utilizing pilot frequency control.

SEE OR SEARCH THIS CLASS, SUBCLASS:

85, for signal feedback amplifiers having an amplifier in the feedback path.

86, for signal feedback amplifiers having a variable impedance in the feedback path controlled by a separate control path.

96, for signal feedback amplifiers combined with control of bias of the signal amplifier.

127+, appropriate subclasses, for control of bias or power supply, particularly subclasses 130 and 132. See the search notes under subclass 127. See also (2) Note under subclass 130.

143, for amplifiers having a thermally responsive impedance which may be controlled by a separate means.

144+, for amplifiers having a variable impedance which may be controlled by a separate control path.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, appropriate subclasses for pilot current controlled transmission line systems, generally. See the note and search notes.

370, Multiplex Communications, subclasses 491 and 500 for a multiplexing system using pilot control.

53 This subclass is indented under the class definition. Subject matter wherein the signal energy is coupled to or from the amplifying device by means including distributed parameter wave transmission means; or circuit networks of lumped parameters or impedances designed to simulate the impedance characteristics of distributed parameter wave transmission means.

(1) Note. Distributed parameter transmission means as used in the definition above include long lines and long line elements such as telephone and telegraph lines, lecher lines, parallel transmission lines, in general, concentric lines, wave guides, cavity resonators, tuned transmission lines, etc., which possess distributed capacitance and inductance. For the definition of such means and "lumped parameter or impedance" means as used above, see the class definition for Class 333, Wave Transmission Lines and Networks. Subject matter involving inherent capacity or inductance, as for example, between electrodes, or of a lead inside a tube when made use of as a lumped reactance circuit element, is classified in the appropriate subclass involving the circuit. Neutralization by feedback is classified in subclasses 76+ below.

(2) Note. Subject matter including distributed parameter circuit coupling means when combined with a special type of amplifying device is classified with the special type of device and not in this subclass. For example, subclass 43, for amplifiers having traveling wave type tubes, which include distributed parameter type delay lines, or wave guides.

SEE OR SEARCH THIS CLASS, SUBCLASS:

3, for amplifiers having plural diverse type amplifying devices.

4, for amplifiers having a maser type amplifying device.

5, for amplifiers which have solid element wave propagating amplifying devices.

43, for amplifiers having a traveling wave type tube amplifying device.

45, for electron beam tube amplifying devices coupled to a cavity resonator.

49, for amplifiers having an amplifying device of the vacuum tube type hav-

ing distributed parameter characteristics.
107, for signal feedback amplifiers having phase shift means in the loop path.
157+, for amplifier interstage coupling.
185+, for amplifier input coupling.
192+, for amplifier output coupling.

SEE OR SEARCH CLASS:
315, Electric Lamp and Discharge Devices: Systems, appropriate subclasses indented under subclass 3 and subclass 39 for distributed parameter impedance devices.
333, Wave Transmission Lines and Networks, appropriate subclasses for passive distributed impedance devices. See the notes under the class definitions and search notes under the pertinent subclasses of Class 333.

54 This subclass is indented under subclass 53. Subject matter wherein a plurality of amplifier devices are in a system having a single source and load, include a delay line coupling (which may be a distributed parameter line, or an artificial line) and wherein the inputs or outputs of such amplifier devices are coupled to such delay line means at phase displaced points.

(1) Note. Push-pull amplifiers including delay line coupling, per se, are not classified in this subclass but in subclass 55 below.

SEE OR SEARCH THIS CLASS, SUBCLASS:
124+, for plural channel amplifiers. See the notes and search notes thereunder.

55 This subclass is indented under subclass 53. Subject matter including at least one push-pull stage of amplification.

(1) Note. A push-pull stage of amplification for this class requires a balanced input to two tubes and a balanced output therefrom; for further details of the definition of a push-pull stage of amplification see the class definitions of this class, section I.

SEE OR SEARCH THIS CLASS, SUBCLASS:
118+, for push-pull amplifiers generally. See the notes and search notes thereunder.

56 This subclass is indented under subclass 53. Subject matter wherein the distributed parameter wave transmission means is of the wave guide, cavity concentric line type and is resonant.

SEE OR SEARCH THIS CLASS, SUBCLASS:
45, for electron beam tube amplifying device coupled to a cavity resonator.
94, and 109, for signal feedback amplifiers having frequency responsive means in the feedback path.
302+, for semiconductor amplifiers having frequency responsive in the signal transmission path.

SEE OR SEARCH CLASS:
331, Oscillators, subclass 83 for multicavity beam tube oscillators (Klystrons).
333, Wave Transmission Lines and Networks, subclasses 219+ for distributed parameter type resonators. See the note and search notes to this subclass.

57 This subclass is indented under subclass 53. Subject matter wherein there is included as a signal coupling means a circuit network of lumped parameters or impedances, which is designed to simulate the impedance characteristics of a distributed parameter wave transmission means.

(1) Note. Distributed parameter transmission means as used in the definition above include long lines and long line elements such as telephone and telegraph lines, lecher lines, parallel transmission lines, in general, concentric lines, wave guides, cavity resonators, tuned transmission lines, etc.., which possess distributed capacitance and inductance. For the definition of such means and “lumped parameter or impedance” means as used above, see the class definition for Class 333, Wave Transmission Lines and Networks. Subject matter

involving inherent capacity or inductance, as for example, between electrodes, or of a lead inside a tube when made use of as a lumped reactance circuit element, is classified in the appropriate subclass involving the circuit. Neutralization by feedback is classified in subclasses 76+ below.

SEE OR SEARCH CLASS:
333, Wave Transmission Lines and Networks, subclass 23, for passive type artificial line, per se; and subclasses 138+, for delay lines.

58 This subclass is indented under the class definition. Subject matter wherein the amplifying device is provided with a rotating dynamoelectric means; and wherein the power supply electrical energy source which is controlled, may be developed by conversion of mechanical energy to electrical energy by the motion of the armature of the dynamoelectric means, the signal current being applied to magnetic field means of the device, so that a current is generated which varies with the signal current supplied; or the rotating dynamoelectric means may act as a motor with the signal current applied to the rotating means or the field means, and the rotary motion of the device may be utilized as a variable resistor means to effect a control of the power supply source.

(1) Note. Subject matter, as defined above, is classified herein where the device is disclosed as designed to amplify a signal. Where the system is primarily for the conversion of electrical energy into mechanical energy or vice versa, or is of general utility, classification is in Class 310, Electrical Generator or Motor Structure, or Class 322, Electricity: Single Generator Systems, as described in the, SEARCH CLASS, below. Where the structure of a dynamoelectric machine is claimed, alone, classification is in the appropriate subclass of Class 310, Electrical Generator or Motor Structure.

SEE OR SEARCH CLASS:
310, Electrical Generator or Motor Structure, subclasses 10+ and subclasses indented thereunder for the structure of dynamoelectric machines, per se, especially indented subclasses 139 and 151 for the structure of generators of the rotary amplifier type.
322, Electricity: Single Generator Systems, appropriate subclasses particularly subclass 61 for generators with alternating current excitation and subclasses 90 and 91+ for rotating amplifiers, especially indented subclass 92 for such amplifiers of the crossed-field type.

59 This subclass is indented under the class definition. Subject matter including means controlled by light or activated by light which may be involved in the amplifying device, per se, used as a control means, or which may be included in any other part of the amplifier.

(1) Note. Subject matter wherein light controlled or activated means is not a part of the amplifier but is combined therewith (as for example, as a photo-electric cell with light means therein feeding a signal current to a vacuum tube amplifier) is not classified in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:
308, for amplifiers having atomic particle or radiant energy impinging on a semiconductor amplifying device. See the search notes thereunder.

SEE OR SEARCH CLASS:
250, Radiant Energy, subclasses 200+, appropriate subclasses for photocell circuits. See also the notes and search notes under subclass 200.

60 This subclass is indented under the class definition. Subject matter wherein the amplifying device includes magnetostrictive means, that is, means for cyclically changing the dimensions of a body of magnetic material under the influence of a cyclically changing magnetic field in proximity to the body of magnetic material.

SEE OR SEARCH THIS CLASS, SUBCLASS:
174, for interstage coupling including electromechanical transducer means (e.g.,

piezoelectric crystals). See the search notes thereunder.

SEE OR SEARCH CLASS:
333, Wave Transmission Lines and Networks, subclasses 148+ and 186+ for electromechanical transducer delay lines and filters, respectively. See the search notes thereunder.
336, Inductor Devices, subclass 20 for inductive devices having magnetostrictive (deformable) cores.

61 This subclass is indented under the class definition. Subject matter wherein the amplifying device, to which the electric input signal is applied to control the power supply source of electric energy also applied thereto, is a resistive means, which may be liquid, solid, or of granular construction.

(1) Note. Not included herein, are other devices having resistive properties such as gas tubes, vacuum tubes, etc.

(2) Note. Variable resistors, although including a sensing means and/or power supply means, as structure are classified in Class 338, Electrical Resistors. Where such subject matter involves a load circuit, classification is herein, when the signal output is "substantially a replica of the signal input"; otherwise classification is in the appropriate subclass of Class 323, Electricity: Power Supply or Regulation Systems.

SEE OR SEARCH THIS CLASS, SUBCLASS:
250+, for amplifiers with semiconductor type amplifying devices. See the notes and search notes thereunder.

SEE OR SEARCH CLASS:
323, Electricity: Power Supply or Regulation Systems.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for systems utilizing variable resistance devices of the nonlinear conductor type and which systems are not elsewhere classifiable.
338, Electrical Resistors, appropriate subclasses for the structure of resistors, per se, especially subclass 100. See (1) Note above.

62 This subclass is indented under subclass 61. Subject matter wherein the amplifying device resistive means is of a type whose resistance value varies in response to a magnetic field or a change in magnetic field, and includes means for applying such magnetic field to the resistive means.

SEE OR SEARCH THIS CLASS, SUBCLASS:
6, for amplifiers having Hall Effect type amplifying devices.
60, for amplifiers having magnetostrictive means.
63, for amplifiers having an amplifying device with magnetic means, generally.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 511 for miscellaneous circuits using the Hall effect.
338, Electrical Resistors, subclass 32 for electrical resistors whose resistance value changes in response to a magnetic field or a change in magnetic field.

63 This subclass is indented under the class definition. Subject matter wherein the amplifying device includes a magnetic means to control the power supply energy or is involved in the structure of the amplifying device in some other manner and which is not provided for above.

SEE OR SEARCH THIS CLASS, SUBCLASS:
6, for amplifiers including Hall effect type amplifying devices.
41, for amplifiers including gaseous or vapor type amplifying devices which may have magnetic means for deflection or other purposes.
44+, for amplifiers having electron beam tube amplifying devices which may have magnetic means for beam deflection, focusing or other purposes.

47+, for amplifiers having magnetically influenced discharge devices including magnetrons.
60, for amplifiers having magnetostrictive means.
62, for amplifiers having magnetoresistive type amplifying devices.

64 This subclass is indented under the class definition. Subject matter wherein the amplifying device is of the vacuum tube type having a positively charged grid (with respect to the cathode) immediately adjacent the cathode, which neutralizes the negative space charge of the electrons emitted from the cathode so that a "virtual cathode" is produced on the side of the space charge grid on which the anode is situated, said tube having a normally negatively biased control grid next to the space charge grid, to which the signal is coupled, and an anode to receive the electrons emitted by the cathode, and which may have additional electrodes between the control grid and the anode.

SEE OR SEARCH THIS CLASS, SUBCLASS:
65, for amplifiers including vacuum tubes of special structural characteristics.
199+, for power or bias voltage supply for amplifiers, see the search notes thereunder.

SEE OR SEARCH CLASS:
313, Electric Lamp and Discharge Devices, appropriate subclasses, for discharge device structure, per se.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 524+ for miscellaneous electron tube circuits with space charge grid tubes.
329, Demodulators, subclass 368 for an amplitude demodulator using an electron discharge device of three or more electrodes.

65 This subclass is indented under the class definition. Subject matter involving the structure of any amplifier circuit element, such as resistors, vacuum tubes, etc., with the exception of the structure of transformer elements, or of the structural relationships of such elements in the amplifier.

(1) Note. The term structure, herein, refers to the arrangement in space of the parts to the whole of the circuit element or of the elements comprising the amplifier which includes also the material of which such parts are constructed. The term structure is distinguished from circuit or circuit arrangement in that the latter refers to an abstract schematic of parts identified broadly by their function in the circuit and arranged according to the sequence of signal current flow and not according to actual arrangement in space, or construction.

(2) Note. Subject matter involving the structure of transformers is not classified in this or indented subclasses but in subclasses 171, 190, or 197 below.

(3) Note. Subject matter involving the structure of any amplifying device or associated therewith, of the types specifically provided for above are not classified in this or indented subclasses but in the appropriate subclasses for those types, above.

SEE OR SEARCH THIS CLASS, SUBCLASS:
53+, for amplifiers having distributed parameter coupling means including the structure of such distributed parameter means.

SEE OR SEARCH CLASS:
174, Electricity: Conductors and Insulators, for the structure of electrical insulators and conductors.
200, Electricity: Circuit Makers and Breakers, for the structure of switches and circuit breakers.
313, Electric Lamp and Discharge Devices, appropriate subclasses for the structure of electric discharge devices (vacuum tubes and gas tubes), per se.
315, Electric Lamp and Discharge Devices: Systems, subclasses 3+ for combined cathode-ray tube and circuit element structure, subclasses 32+ for vacuum or gas tubes combined with integral circuit structure or tempera-

ture modifying means structure where the tube is the load device.

334, Tuners, appropriate subclasses for tuners, per se.

336, Inductor Devices, appropriate subclasses for inductor structure.

338, Electrical Resistors, for the structure of resistors and rheostats.

361, Electricity: Electrical Systems and Devices, subclasses 271+ for capacitor structure, subclasses 600+ for housing and mounting assemblies with plural diverse electrical components, subclasses 679+ for electronic systems and devices, and subclasses 500+ for electrolytic capacitors.

439, Electrical Connectors, appropriate subclasses for the structure of electrical connectors.

455, Telecommunications, subclasses 130+ for radio receiver structure in general; and subclass 351 for portable radio receivers.

66 This subclass is indented under subclass 65. Subject matter wherein the capacitive electrode structure, inductor structure, resistors, conductors, connectors and/or related circuit elements form a conductive coating on a base. For example, such as is produced by printing, spraying, electro-deposition or similar coating method, or by the removal of adherent conducting material from an insulating base by etching, grinding, or the like.

SEE OR SEARCH CLASS:

174, Electricity: conductors and Insulators, subclasses 250+ for preformed panel circuit arrangement (e.g., printed circuits).

336, Inductor Devices, subclass 200 for inductor coil structure of the printed circuit type. See the search notes thereunder.

361, Electricity: Electrical Systems and Devices, subclasses 736+ and 748+ for printed circuits of the type used in radios.

439, Electrical Connectors, subclasses 55+ for connectors of the preformed panel circuit (e.g., printed circuit) type.

67 This subclass is indented under subclass 65. Subject matter wherein the structure involved is that of a capacitor or capacitive element of the amplifier circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

157+, appropriate subclasses thereunder for interstage coupling circuits involving capacitors.

185+, appropriate subclasses for input coupling circuits involving capacitors.

192+, appropriate subclasses for output coupling circuits involving capacitors.

SEE OR SEARCH CLASS:

334, Tuners, appropriate subclasses for tuned networks for use in wave energy apparatus and comprising inductance and capacitance elements in circuit arrangement to form a resonant circuit and in which structure is provided for adjusting one or both of these elements for changing the mean resonant frequency of the circuit.

361, Electricity: Electrical Systems and Devices, subclasses 271+ and 503+ for capacitor structure, per se.

68 This subclass is indented under subclass 65. Subject matter wherein the structure is some means for shielding at least part of the amplifier from external electric or magnetic fields, or such structure to protect parts of the device from undesired electric or magnetic fields originating in another part of the device, or such structure to prevent the amplifier or a part thereof from emanating undesired electric or magnetic fields.

SEE OR SEARCH THIS CLASS, SUBCLASS:

170, for shielding involved in interstage transformers.

190, for shielding involved in input transformers.

197, for shielding involved in output transformers.

SEE OR SEARCH CLASS:

174, Electricity: Conductors and Insulators, subclasses 32+ for miscellaneous anti-inductive structures, see particu-

larly subclasses 35+ for miscellaneous electrical shields and screen structures not elsewhere classifiable. The search notes to subclasses 32+ indicate further fields of search for anti-inductive and shielding structures.

307, Electrical Transmission or Interconnection Systems, subclasses 89+ for anti-inductive means to prevent or modify the coupling between electrical systems, particularly subclass 91, for "shielding means". See the search notes thereunder.

333, Wave Transmission Lines and Networks, subclass 12 for transmission line inductive or radiation interference reduction systems which include shielding means for the purpose. See the search notes thereunder.

334, Tuners, subclass 85 for a tuner having shielding or housing means.

69 This subclass is indented under the class definition. Subject matter including at least two sources of signal voltage which are combined in the amplifier so that the signal output of the amplifier is a linear function of the sum or difference of the signal input sources.

(1) Note. Balanced input circuits or balanced output circuits are considered single signal sources or loads in this class. Therefore a balanced to unbalanced amplifier is not classified in this subclass but in subclass 116 below.

SEE OR SEARCH THIS CLASS, SUBCLASS:

74, for series energized vacuum tube amplifiers with plural separate signal inputs.

81, for signal feedback amplifiers having at least one push-pull stage.

116, for amplifiers having balanced-to-unbalanced coupling. See (1) Note above.

118+, for amplifiers including a push-pull stage.

124+, for amplifiers with plural amplifier channels.

147, for amplifiers having plural signal inputs. See the notes and search notes thereunder.

252+, and 295, for semiconductor amplifiers having plural channels or plural inputs.

301, for semiconductor amplifiers having balanced-to-unbalanced or unbalanced-to-balanced coupling.

70 This subclass is indented under the class definition. Subject matter including at least two amplifying devices of the vacuum tube type, each having at least three electrodes including a control grid electrode, wherein at least a portion of the anode-cathode power supply current, for one of the amplifying devices, flows in series from the power supply source through the space discharge path of the other amplifying device, so that the tubes are series energized (at least in part) from the power supply.

SEE OR SEARCH THIS CLASS, SUBCLASS:

87+, for cathode impedance feedback, particularly subclass 95.

128, for control means for the anode circuit including diode space discharge paths in such circuits.

202, for anode power supply, generally. See the search notes thereunder.

293, and 310+, for cascaded semiconductor amplifiers series energized for power.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 530+ for miscellaneous electron tube circuits with a particular source of power or bias voltage.

329, Demodulators, appropriate subclasses for a demodulator with particular power supply circuitry.

71 This subclass is indented under subclass 70. Subject matter wherein power supply current for one or more vacuum tube amplifying devices is supplied through at least two separate space discharge paths of at least two vacuum tubes.

(1) Note. Subject matter including separate and distinct groups of pairs of vacuum tubes having separate and distinct series energized space discharge paths is also included in this subclass.

(2) Note. A series of three or more vacuum tubes arranged in series for power supply which comprises a single discharge path for the anode power supply is excluded from this subclass.

72 This subclass is indented under subclass 71. Subject matter including two pairs of series energized tubes wherein one tube of each pair is supplied through its space discharge path with anode-cathode power supply current from the power supply source, and wherein each of the four vacuum tubes is arranged in the arms of a Wheatstone bridge.

73 This subclass is indented under subclass 70. Subject matter including at least two separate signal output circuits.

SEE OR SEARCH THIS CLASS, SUBCLASS:

148, for signal amplifiers having plural separate signal outputs. See the notes and search notes thereunder.

74 This subclass is indented under subclass 70. Subject matter including at least two separate input circuits for each of two series energized vacuum tube amplifying devices.

(1) Note. A balanced (or push-pull) input circuit is treated as a single input circuit in this class and not as two separate input circuits.

SEE OR SEARCH THIS CLASS, SUBCLASS:

69, for sum and difference amplifiers.

147, for amplifiers with plural signal inputs. See the notes and search notes thereunder.

75 This subclass is indented under the class definition. Subject matter wherein signal feedback circuit means are provided to superimpose a portion of the electrical signal output energy on the amplifier input signal.

(1) Note. The above amplifier may be any stage or group of stages of a cascaded amplifier.

(2) Note. The signal feedback of amplifiers classified in this and indented subclasses is distinguished from the type of feedback which may be found in amplifier gain control circuits principally in subclasses 129+ in that the latter involves the development from the signal, of a D.C. voltage which is filtered and smoothed and then applied to an amplifier electrode to control the bias thereon; whereas in this and indented subclasses the feedback voltage which is applied to the input electrode varies in each instant in the same manner that the signal varies and may be in any phase relationship with the input signal (i.e., in phase, 180° out of phase or any other phase angle relationship).

(3) Note. The term “loop path” as used in some of the indented subclasses refers to the loop formed by the forward signal path from the signal input electrode in the circuit to which the signal feedback is applied to the output and in addition the signal feedback path from the signal output electrode from which the feedback is derived to the signal input electrode to which the signal feedback is applied.

(4) Note. In feedback amplifiers there is an impedance shared by the input and output circuits which may be a transformer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

291+, for semiconductor amplifiers having signal feedback.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 590 for miscellaneous circuits with signal feedback.

329, Demodulators, subclass 319 for feedback used in frequency demodulation noise reduction, and subclass 367 for regenerative feedback in an amplitude demodulator.

331, Oscillators, appropriate subclasses, for oscillator circuits utilizing feedback.

700, Data Processing: Generic Control Systems or Specific Applications, appropriate subclasses for data processing control systems, particularly subclasses 1 through 89 for closed loop feedback systems.

76 This subclass is indented under subclass 75. Subject matter wherein the "signal feedback circuit means" are provided from compensating for or nullifying the undesirable feedback caused by any inter-electrode impedances of a vacuum tube amplifying device.

(1) Note. The undesirable feedback effects are usually caused by capacitive inter-electrode impedance although the inter-electrode impedance involved may be inductive or conductive (e.g., resistive).

(2) Note. Neutralization of the effects of inter-electrode impedances by other than feedback means is not specifically provided for in this and indented subclasses but is classified with the specific circuit means involved, as for example, in input or output coupling, (subclasses 185+ and 192+, respectively). Where the inter-electrode impedance is made use of, as for example, where the input (grid-cathode) capacitance is part of the tuned input circuit classification is in the appropriate subclass considering the inter-electrode capacitance as though it were a conventional external circuit element.

(3) Note. Grounded grid amplifiers which inherently mitigate the effects of inter-electrode capacitances in vacuum tubes are classified in the cathode coupled subclasses for which see subclasses 186 and 193 and the search notes thereunder.

SEE OR SEARCH THIS CLASS, SUBCLASS:

50, for amplifiers having a dummy tube.

65+, for the structure of elements of the amplifier circuit including vacuum tubes but excluding transformers, per se.

292, for semiconductor amplifiers involving compensating feedback for inter-electrode impedance (e.g., neutralization).

SEE OR SEARCH CLASS:

329, Demodulators, subclass 319 for feedback used in frequency demodulation noise reduction, and subclass 367 for regenerative feedback in an amplitude demodulator.

331, Oscillators, subclasses 175+ for oscillator systems wherein the inter-electrode impedance of the active element of the oscillator may be compensated for stabilizing the frequency of the generated oscillations.

77 This subclass is indented under subclass 76. Subject matter including at least one push-pull stage of signal amplification.

(1) Note. For the definition of a push-pull stage of amplification see the class definitions, section I.

SEE OR SEARCH THIS CLASS, SUBCLASS:

81+, for feedback amplifiers having at least one push-pull stage. See the search notes thereunder.

118+, for amplifiers including a push-pull stage. See search notes thereunder. See also (1) Note above.

78 This subclass is indented under subclass 76. Subject matter wherein the feedback for nullifying or mitigating the effects of inter-electrode impedance is applied to or from an electrode common to the input and output circuits of an amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

87+, for cathode impedance feedback. (See the search notes thereunder).

111, for signal feedback to or from an auxiliary grid or to the anode. See the search notes thereunder.

79 This subclass is indented under subclass 76. Subject matter wherein the signal feedback for compensating for inter-electrode impedance is coupled back to the input from the output by means of a transformer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

165+, for amplifiers having interstage transformer coupling. See the search notes thereunder.

188+, for amplifier input transformer coupled circuits. See search notes thereunder.

195+, for amplifier output transformer coupled networks. See search notes thereunder.

80 This subclass is indented under subclass 76. Subject matter wherein an inter-electrode capacitance which may be between the grid and cathode or anode and grid is compensated for by a feedback circuit including an inductance in parallel with such inter-electrode capacitance (in the feedback path) and resonant therewith.

SEE OR SEARCH THIS CLASS, SUBCLASS:

109, for amplifiers having frequency responsive feedback means.

81 This subclass is indented under subclass 75. Subject matter including at least one stage of push-pull signal amplification.

(1) Note. For the definition of a stage of push-pull amplification see the class definition, Glossary.

SEE OR SEARCH THIS CLASS, SUBCLASS:

77, for amplifiers having at least one push-pull stage and including feedback means to compensate for inter-electrode impedances.

118, for amplifiers having at least one push-pull stage. See the search notes thereunder. See also (1) Note above.

82 This subclass is indented under subclass 81. Subject matter including at least one signal feedback means wherein the signal feedback at the amplifier device input means has a component in phase with the input signal at this point in the circuit, and at least one signal feedback means wherein the signal feedback at the amplifier device input means has a component opposite in phase with the input signal at the amplifier input to which such feedback is applied.

SEE OR SEARCH THIS CLASS, SUBCLASS:

89, for cathode-cathode feedback for cascaded adjacent amplifier stages.

93, for combined diverse type feedback coupling including positive feedback.

101, for positive and negative in the same path at different frequencies.

104, for positive and negative feedback generally.

83 This subclass is indented under subclass 81. Subject matter wherein the signal feedback path from the output electrode of the amplifier device from which the signal feedback is derived to the input electrode of the amplifying device to which the signal feedback is applied has a D.C. conductive path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for amplifiers having periodic switching input-output comparison including those with D.C. conductive feedback paths.

97, for amplifiers having a D.C. conductive signal feedback path.

84 This subclass is indented under subclass 75. Subject matter involving plural amplifier channels combined in addition, for one or more channels, with signal feedback means above.

(1) Note. Subject matter wherein the signal feedback is derived from the signal output of one amplifier signal channel and applied to the signal input of another amplifier signal channel, is classified in this subclass.

(2) Note. For the definition of plural amplifier channels see subclass 124 below.

SEE OR SEARCH THIS CLASS, SUBCLASS:

124+, for amplifiers with plural amplifier channels. See the notes and search notes thereunder.

85 This subclass is indented under subclass 75. Subject matter wherein the "signal feedback circuit means" has an amplifier therein, as defined in the class definition, which may have bias control means.

SEE OR SEARCH THIS CLASS, SUBCLASS:

86, for amplifiers having a variable impedance in a signal feedback path varied by a separate control path.

96, for amplifiers having signal feedback combined with means to control the bias of an electrode in the signal amplifier.

129+, for amplifiers having control of the input electrode or gain control electrode bias. See the search notes thereunder.

144+, for amplifiers having a variable impedance for the signal channel controlled by a separate control path. See the search notes thereunder.

SEE OR SEARCH CLASS:

329, Demodulators, subclass 319 for feedback used in frequency demodulation noise reduction, and subclass 367 for regenerative feedback in an amplitude demodulator.

86 This subclass is indented under subclass 75. Subject matter wherein the "signal feedback circuit means" has a variable impedance therein, which is varied by means of a control which may be a variable control voltage or a motor control means, the control to vary the variable impedance being derived, developed and applied by a path separate from that involving the variable impedance and the immediately associated signal transmission path.

(1) Note. This subclass excludes "nonlinear" or other impedances in the signal feedback path which vary merely by the signal feedback current flow therethrough and which are not provided with a "separate" means to control the variable impedance. Such subject matter is classified in subclasses 95 and 110 of this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

143, for amplifiers having a thermally responsive impedance which may be separately controlled.

144+, for amplifiers having a variable impedance for the signal channel varied by a separate control path. See the search notes thereunder.

87 This subclass is indented under subclass 75. Subject matter wherein the "signal feedback circuit means" or the "shared impedance of the input and output circuits" or a portion thereof is an impedance between the cathode of a vacuum tube amplifying device and ground or other convenient electrical potential reference plane.

(1) Note. For this and indented subclasses the anode current flowing through the "cathode impedance" develops a variable signal potential on the cathode which, relative to the grid of the same amplifying device is effective as a negative signal feedback in that amplifying device; and which may in addition be applied as a signal feedback from such cathode impedance to another input electrode of the same amplifying device (or an amplifying device of a preceding stage); or to which cathode impedance a signal feedback may be applied from an output electrode of the same amplifying stage or a following signal amplifying stage.

(2) Note. Subject matter involving cathode coupling, such as cathode follower output circuits or where coupling is to the cathode and there is normally no cathode impedance signal feedback as in "bootstrap" coupling (subclass 156, below) or where no signal feedback function is indicated, is not classified in this and indented subclasses but in the appropriate cathode coupling subclasses below such as subclasses 186+, for input circuit network coupling to the cathode and subclasses 193+, for output circuit coupling from the cathode. See the internal search notes under these subclasses for

other subclasses of this class involving cathode coupling.

(3) Note. The above requirement of (2) Note, for classification in this and indented subclasses, namely, that where cathode coupling is involved an indication that signal feedback is present in the circuit, applies to all of these subclasses except subclass 89 involving cathode impedance feedback between adjacent stages. Where there is cathode-to-cathode coupling of adjacent cascaded stages classification is in subclass 89 regardless of whether signal feedback is indicated or not.

(4) Note. Subject matter involving a cathode impedance which does not develop a signal feedback voltage but is by-passed in such manner that a D.C.. bias voltage is developed, or due to operating conditions, is disclosed, in the case of a single by-passed resistor, as developing a D.C. bias there across and not a voltage varying with the signal, are not classified in this and indented subclasses but in subclass 142 below.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70+, for vacuum tube amplifying device amplifiers series energized for power.
78, for signal feedback circuits compensating for inter-electrode impedances to or from a common electrode.
119, for push-pull amplifiers involving cathode coupling.
158+, for interstage coupling to the cathode.
168, for transformer interstage coupling from the cathode.
172+, for interstage coupling from the cathode.
186+, for input coupling to the cathode.
193+, for output coupling from the cathode.
291+, for semiconductor amplifiers having signal feedback means.
297, for semiconductor amplifiers series energized for power.

88 This subclass is indented under subclass 87. Subject matter involving at least two stages of amplification wherein the output of each stage is coupled to the input of the preceding stage except the first, and wherein at least two of the stages are arranged as defined in subclass 87 with signal feedback from the cathode impedance of the latter of the cascaded stages to the cathode impedance of a preceding stage.

SEE OR SEARCH THIS CLASS, SUBCLASS:

92, for signal feedback to the cathode impedance of a prior stage combined with diverse type signal feedback.
98+, for signal feedback in cascaded amplifiers generally.

89 This subclass is indented under subclass 88. Subject matter wherein the cathode-cathode feedback is between adjacent stages.

(1) Note. Where there is cathode-to-cathode coupling of adjacent cascaded stages classification is in subclass 89 regardless of whether signal feedback is indicated or not.

90 This subclass is indented under subclass 87. Subject matter combined with a type of signal feedback as defined in subclass 75, which is diverse from the type of feedback defined in subclass 87.

91 This subclass is indented under subclass 90. Subject matter wherein the diverse signal feedback is derived from the cathode feedback impedance and fed to the input electrode of the same or a prior stage; or wherein the diverse signal feedback is derived from an output electrode of the same or a following stage and applied to the cathode impedance.

SEE OR SEARCH THIS CLASS, SUBCLASS:

78, for signal feedback to or from a common electrode compensating for inter-electrode impedance.

92 This subclass is indented under subclass 91. Subject matter wherein the diverse signal feedback is derived from an electrode other than the cathode and applied to the cathode impedance of a prior stage whereby the diverse signal feedback path includes or overlaps the cathode impedance feedback path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

100, for amplifiers having multiple signal feedback paths in general, including signal feedback to the input of a prior stage.

93 This subclass is indented under subclass 90. Subject matter including a signal feedback means whereby the feedback has a component in phase with the signal applied at the input electrode to which the signal feedback is applied.

SEE OR SEARCH THIS CLASS, SUBCLASS:

82, for push-pull amplifiers having positive and negative feedback.

89, for cathode-to-cathode feedback between adjacent stages.

101, for positive and negative feedbacks in the same path at different frequencies.

104, for positive and negative feedback, generally.

112, for positive feedback, generally.

SEE OR SEARCH CLASS:

329, Demodulators, subclass 367 for an amplitude demodulator utilizing regenerative feedback.

331, Oscillators, appropriate subclasses for oscillators operating on the positive feedback principle.

333, Wave Transmission Lines and Networks, subclasses 213+ for negative resistance and/or reactance networks of the active element type which usually include positive feedback.

455, Telecommunications, subclass 336 for superregenerative receivers; and subclass 337 for regenerative receivers.

94 This subclass is indented under subclass 87. Subject matter including in the "cathode impedance to ground signal feedback path" or in shunt therewith circuit means which acts on the signal feedback to affect some frequency component of the signal feedback differently from the other frequency components of the signal feedback, for example, a tuned circuit or filter circuit which eliminates a frequency component, or an equalizer which emphasizes or de-emphasizes the signal feedback amplitude of some frequency or frequency range of the signal feedback with respect to others.

SEE OR SEARCH THIS CLASS, SUBCLASS:

107, for amplifiers having phase shift means in the loop path.

109, for amplifiers having frequency responsive signal feedback means.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 24+ for passive coupling networks in general.

95 This subclass is indented under subclass 87. Subject matter wherein the "cathode impedance signal feedback path" has therein a nonlinear impedance circuit element, which may be resistive, capacitive, or inductive, and whose impedance is such, that the relationship for changes in voltage, between the voltage across the nonlinear element to the current flow therein is nonlinear.

SEE OR SEARCH THIS CLASS, SUBCLASS:

86, for amplifiers having a variable impedance in the feedback path varied by a separate control path. See the search notes thereunder.

110, for amplifiers having a nonlinear impedance device in the loop path.

183, for amplifiers having a D.C. interstage coupling means including a nonlinear impedance element. See the search notes thereunder.

96 This subclass is indented under subclass 75. Subject matter combined with bias voltage control means for a signal amplifying device.

(1) Note. For the definition of an amplifier with bias voltage control see subclass 129 below.

SEE OR SEARCH THIS CLASS, SUBCLASS:

129+, for amplifiers having bias voltage control means. See the search notes thereunder.

97 This subclass is indented under subclass 75. Subject matter wherein the signal feedback path, from the output electrode of the amplifying device from which the signal feedback is derived to the input electrode of the amplifying device to which the signal feedback is applied, is a D.C.. conductive path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for amplifiers having periodic switching means for input-output comparison including those with D.C. conductive feedback paths.

83, for push-pull amplifiers having D.C. conductive signal feedback paths.

98 This subclass is indented under subclass 75. Subject matter including at least two stages of amplification (each as defined in the class definition) wherein the means for coupling the input signal for each stage except the first is coupled to the means for coupling the output signal of the preceding amplifier; combined with signal feedback means above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

88+, for cathode-cathode signal feedback in cascaded amplifiers.

92, for cascaded amplifiers with signal feedback to the cathode impedance of a prior stage.

99 This subclass is indented under subclass 98. Subject matter including at least two signal feedback circuit means as defined therein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

88+, for cascaded amplifiers having cathode-to-cathode signal feedback.

90+, for amplifiers having cathode impedance signal feedback combined with diverse type signal feedback coupling.

100 This subclass is indented under subclass 99. Subject matter wherein at least one of the signal feedback means has the signal feedback applied to the signal input of a prior stage so that the path of such feedback means extends to include all or a portion of at least one other signal feedback means (overlapping feedbacks).

SEE OR SEARCH THIS CLASS, SUBCLASS:

88+, for cascaded amplifiers having cathode-to-cathode signal feedback means.

92, for cascaded amplifiers including feedback to the cathode impedance of a prior stage.

101 This subclass is indented under subclass 75. Subject matter wherein a single signal feedback circuit means through an impedance shared by the same input and output circuits has for currents flowing through the same shared feedback impedance at one frequency a signal feedback in phase (positive feedback) with the signal input where the signal feedback is applied and at least at some other frequency a signal feedback component flowing through the same feedback impedance, in opposite phase with the signal (negative feedback).

SEE OR SEARCH THIS CLASS, SUBCLASS:

82, for amplifiers having at least one stage of push-pull amplification including both positive and negative feedback.

89, for cascaded amplifiers having cathode-cathode signal feedback between adjacent stages.

93, for amplifiers having cathode impedance feedback and positive feedback.

104, for amplifiers having multiple signal feedbacks including both positive and negative feedback.

102 This subclass is indented under subclass 75. Subject matter including signal feedback proportional to the current flow through the output load which receives the amplified signal, and signal feedback proportional to the voltage across the output load.

SEE OR SEARCH THIS CLASS, SUBCLASS:

105, for amplifiers with signal feedback from an impedance in series with the output load (e.g., current feedback).

103 This subclass is indented under subclass 75. Subject matter including two or more signal feedback circuit means as therein defined and not previously provided for in this schedule.

SEE OR SEARCH THIS CLASS, SUBCLASS:

88+, for cascaded amplifiers having cathode-cathode signal feedback.

90+, for cathode impedance signal feedback combined with diverse type signal feedback.

99+, for cascaded amplifiers having multiple feedbacks.

102, for amplifiers having current and voltage feedback.

104 This subclass is indented under subclass 103. Subject matter including at least one signal feedback means having a component of the signal feedback in phase with the signal at the point in the circuit where the signal is applied and at least one signal feedback circuit means having a signal feedback component which is in phase opposition with the signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:

82, for push-pull amplifiers having negative and positive feedback means.

89, for cascaded amplifiers having cathode-cathode signal feedback between adjacent stages.

93, for cathode impedance feedback combined with diverse type feedback coupling including positive feedback.

101, for positive and negative feedback in the same path at different frequencies.

SEE OR SEARCH CLASS:

329, Demodulators, subclass 367 for an amplitude demodulator utilizing regenerative feedback.

331, Oscillators, appropriate subclasses for oscillators operating on the positive feedback principle.

333, Wave Transmission Lines and Networks, subclasses 213+ for negative resistance and/or reactance networks of the active element type which usually include positive feedback.

455, Telecommunications, subclass 336 for superregenerative receivers; and subclass 337 for regenerative receivers.

105 This subclass is indented under subclass 75. Subject matter wherein the signal feedback is from an impedance in series with the output load which receives the amplified signal, whereby the signal feedback voltage is proportional to the current flowing in the output load.

SEE OR SEARCH THIS CLASS, SUBCLASS:

102, for amplifiers having current and voltage feedback.

106 This subclass is indented under subclass 75. Subject matter wherein the "signal feedback circuit means" is in series with the signal input source between the point in the signal circuit from which the signal feedback is derived to the point in the circuit at which the signal feedback is applied.

107 This subclass is indented under subclass 75. Subject matter wherein the "loop path" (see (3) Note under subclass 75 for the definition of loop path) includes voltage or current phase shift or delay means which may shift the phase of the voltage or current of one signal frequency or signal frequency feedback component with respect to another or shift the phase of the voltage of the signal or signal feedback with respect to the current.

(1) Note. Transformer or amplifier means which inherently shift the phase 1805 are not regarded as phase shift or voltage delay means for this subclass. If such transformer or amplifier include additional phase shift means classification is herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for amplifiers having distributed parameter coupling which may include electric wave delay means.

101, for amplifiers having positive and negative feedback in the same path at different frequencies.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, subclasses 212 through 219 for phase control systems in general.

333, Wave Transmission Lines and Networks, subclasses 138+ for electric wave delay networks, of the passive type, see the search notes thereunder.

108 This subclass is indented under subclass 75. Subject matter wherein the signal transmission path and the "signal feedback circuit means" both include a potentiometer or a part thereof in common.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, for voltage magnitude control systems in general, including resistors.

109 This subclass is indented under subclass 75. Subject matter wherein the "signal feedback circuit means" includes circuit means which acts on the signal feedback to affect some frequency component of the signal feedback differently from the other frequency components of the signal, as for example, a tuned circuit which eliminates a frequency component of the signal feedback or an equalizer which emphasizes or de-emphasizes the amplitude of some frequency range of the signal feedback with respect to others.

SEE OR SEARCH THIS CLASS, SUBCLASS:

94, for frequency responsive cathode impedance feedback means.

107, for signal feedback amplifiers including phase shift means in the loop path including those involving frequency responsive feedback means.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 28 and 167+ for frequency responsive passive coupling networks in general. See the search notes thereunder.

110 This subclass is indented under subclass 75. Subject matter wherein the "loop path" (see (3) Note under subclass 75 for the definition of loop path) includes a nonlinear impedance circuit element, which may be resistive, capacitive, or inductive, and whose impedance is such for changes in voltage applied thereto that the relationship between the voltage across such element to the current flow through the element is nonlinear.

SEE OR SEARCH THIS CLASS, SUBCLASS:

86, for amplifiers having a variable impedance in the feedback path varied by a separate control path. See the search notes thereunder.

95, for amplifiers having a nonlinear impedance element in the cathode impedance feedback path.

143, for amplifiers having a thermally responsive impedance in the signal path.

183, for amplifiers having a D.C. interstage coupling means including a nonlinear impedance element. See the search notes thereunder.

111 This subclass is indented under subclass 75. Subject matter wherein the amplifying device or devices involved are of the vacuum tube type and wherein the signal feedback is derived from an electrode thereof other than the anode or cathode and/or is applied to an electrode thereof other than the cathode or control grid.

SEE OR SEARCH THIS CLASS, SUBCLASS:

160+, for interstage signal coupling involving coupling to the screen grid, plate, suppressor grid (and grid other than the control grid or cathode). See search notes thereunder.

162+, for interstage signal coupling from a grid (from an electrode other than anode or cathode). See search notes thereunder.

112 This subclass is indented under subclass 75. Subject matter wherein the signal feedback has a component in phase with the signal where the feedback is applied and which is not provided for above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

82, for push-pull amplifiers including positive signal feedback.

89, for cascaded amplifiers having cathode-cathode signal feedback.

93, for cathode impedance signal feedback combined with diverse type signal feedback including positive signal feedback.

101, for positive and negative feedback in the same path at different frequencies.

104, for positive and negative feedbacks combined, generally.

SEE OR SEARCH CLASS:

331, Oscillators, appropriate subclasses for oscillators operating on the positive feedback principle.

333, Wave Transmission Lines and Networks, subclasses 213+ for negative resistance and/or reactance networks of the active element type which usually include positive feedback.

455, Telecommunications, subclass 336 for superregenerative receivers; and subclass 337 for regenerative receivers.

113 This subclass is indented under the class definition. Subject matter including a polyphase power supply for the energizing or bias voltage supply applied to any electrode or for a filament or for any heater for a cathode electrode.

SEE OR SEARCH THIS CLASS, SUBCLASS:

114+, for amplifiers having unrectified power supply.

199, for amplifiers involving power or bias voltage supply. See the search notes thereunder.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclasses 13+ for plural load systems of the polyphase type.

310, Electrical Generator or Motor Structure, appropriate subclasses under subclasses 10+ for dynamoelectric machine structure of the polyphase type.

323, Electricity: Power Supply or Regulation Systems, appropriate subclasses for systems in which a single source of supply is connected to a single load and the system includes means for controlling only the magnitude of the current, the voltage, and/or the phase angle between the current and the voltage in the system. The single source may be a polyphase source.

336, Inductor Devices, subclasses 5+ for the structure of polyphase inductor devices.

363, Electric Power Conversion Systems, particularly subclasses 148+ for phase conversion systems from one number of phases to a different number of phases.

114 This subclass is indented under the class definition. Subject matter wherein the source of electrical energy which is controlled by the electrical signal is an A.C. electrical source, which is applied as an A.C. power supply directly to an electrode without any intervening rectifiers to rectify the A.C. electrical supply.

(1) Note. Special types of amplifiers are classified above and subject matter involving unrectified A.C. as a power supply would be classified with the special type of amplifier and not herein. The amplifiers having general vacuum tube amplifying devices with this feature are classified herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70+, for vacuum tube amplifying devices series energized.

113, for amplifiers having a polyphase power supply.

199, for amplifiers involving power or bias voltage supply means, generally. See also search notes thereunder.

296, and 297, for semiconductor amplifiers involving bias or power supply circuits.

SEE OR SEARCH CLASS:

363, Electric Power Conversion Systems, appropriate subclasses thereunder, for power supply means combined with

means to convert A.C. to D.C. or vice versa.

115 This subclass is indented under subclass 114. Subject matter wherein the electrode, to which the A.C. power supply voltage is applied, is a filamentary directly heated cathode.

(1) Note. A.C. power supply for heaters of indirectly heated cathodes are not classified in this subclass but are classified in subclass 113, above, in the special case where they involve a polyphase power supply. Amplifiers with cathode filaments heated by the anode current are classified in subclass 201 of this class. Amplifiers with heater supply otherwise are classified in subclass 199.

SEE OR SEARCH CLASS:
315, Electric Lamp and Discharge Devices: Systems, appropriate subclasses indented under subclass 94, particularly subclasses 97 and 105+ for subject matter involving A.C. power supply to cathodes or cathode heaters.

116 This subclass is indented under the class definition. Subject matter including a circuit in the signal path in the conductors of which electrical signal flows so that at any instant the signal potential in the conductors is substantially equal and opposite in sign with reference to ground or some other convenient reference potential plane; and wherein further, in the signal path there is included a circuit in the conductors of which signal flows which is unbalanced to ground comprising a single-sided output load usually of two conductors one of which is at ground or reference potential.

(1) Note. Subject matter as defined above including additional unbalanced output or load circuits as set forth above is also classified in this subclass.

(2) Note. Balanced circuits are considered as single sources or single loads in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:
69, for sum and difference amplifiers.
117, for amplifiers having unbalanced to balanced coupling.
118, for amplifiers including a push-pull stage. See the search notes thereunder.
301, for semiconductor amplifiers having balanced to unbalanced circuits.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 594 for miscellaneous circuits with particular coupling or decoupling means.
329, Demodulators, appropriate subclasses for demodulators with balanced to unbalanced coupling.
333, Wave Transmission Lines and Networks, subclasses 4+ and 25+ for balanced to unbalanced passive circuits. See the search notes under subclasses 4 and 25.

117 This subclass is indented under the class definition. Subject matter including in the signal path a circuit electrically unbalanced to ground, or a convenient electrical reference potential plane, from a single source of electrical signal and having at some subsequent location of the signal path, with or without one or more intervening amplifying devices, a balanced circuit wherein at least two of the conductors have at any instant electrical signal flowing therethrough substantially equal and opposite in sign with reference to ground or some other convenient reference plane.

(1) Note. Balanced circuits are treated as single sources of electrical signal or as single loads in this class.

(2) Note. Phase splitters are classified in this subclass. Phase inverter amplifier circuits are classified in this subclass and subclass 116 above.

SEE OR SEARCH THIS CLASS, SUBCLASS:
116, for amplifiers having balanced-to-unbalanced coupling.

118, for amplifiers having a push-pull stage. See the notes and search notes thereunder.
301, for semiconductor amplifiers having unbalanced to balanced circuits.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 594 for miscellaneous circuits with particular coupling or decoupling means.
329, Demodulators, appropriate subclasses for demodulators with unbalanced to balanced coupling.
333, Wave Transmission Lines and Networks, subclasses 4+ and 25+ for unbalanced-to-balanced passive circuits. See the search notes under the subclasses 4 and 25.

118 This subclass is indented under the class definition. Subject matter including two amplifiers as defined in the class definition, the input electrodes of each of the amplifying devices of the two amplifiers being balanced to ground or some other convenient electrical reference plane, the source of electrical signal being such, and so coupled to the input electrodes, that at any instant the signal on each input electrode is substantially equal and opposite in sign to the signal on the other input electrode; and wherein the signal on the output electrodes of each of the amplifying devices is similarly balanced to a convenient electrical reference plane.

(1) Note. A balanced signal circuit is treated as a special case of a single source or a single load, in this class.

(2) Note. A push-pull amplifier is treated as a single channel with a single source and a single load in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:
55, for push-pull amplifiers including a push-pull stage.
69, for sum and difference amplifiers similar in structure to push-pull amplifiers.
71+, particularly subclass 72, for push-pull amplifiers included in series energized vacuum tube arrangements.
77, for push-pull amplifiers having feedback compensation to mitigate interelectrode impedance effects.
81+, for amplifiers having at least one push-pull stage having signal feedback.
116, for amplifiers with balanced-to-unbalanced coupling.
117, for amplifiers with unbalanced-to-balanced coupling including phase splitters.
262+, for semiconductor amplifiers including a push-pull stage.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 595 for miscellaneous circuits including push pull circuits.
333, Wave Transmission Lines and Networks, subclasses 4+ and 25+ for passive balanced networks. See the search notes under subclasses 4 and 25.

119 This subclass is indented under subclass 118. Subject matter wherein the two amplifying devices in push-pull are vacuum tube amplifying devices and wherein the input electrodes or the output electrodes are the cathode electrodes of the vacuum tube amplifying devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:
158+, for amplifiers with interstage coupling to the cathode of an amplifying device.
168, and 172, for interstage coupling from the cathode.
186+, for input coupling to the cathode. See the search notes thereunder.
193+, for output coupling from the cathode. See search notes thereunder.

120 This subclass is indented under subclass 118. Subject matter including at least two cascaded stages of amplification, each stages as defined in subclass 118 above and each stage excepting the first having its signal input coupled to the signal output of the preceding stage involving

specific details or distinctive characteristics of the coupling between the stages.

SEE OR SEARCH THIS CLASS, SUBCLASS:

157+, for interstage coupling. See the search notes thereunder.

121 This subclass is indented under subclass 120. Subject matter wherein the signal coupling path from the output electrode of each amplifying device of the preceding stage to the input electrode of the corresponding device of the following stage is a D.C.. conductive path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

159, 161, 163, 172, and 181+, for various types of interstage D.C. coupling. See also the search notes thereunder.

122 This subclass is indented under subclass 118. Subject matter involving specific details or distinctive characteristics of the input and/or output circuits coupling the source to the amplifying devices and the amplifying devices to a load, respectively.

SEE OR SEARCH THIS CLASS, SUBCLASS:

185, for amplifier input networks. See the notes and search notes thereunder.

192, for amplifier output networks. See the notes and search notes thereunder.

123 This subclass is indented under subclass 118. Subject matter including means to control the power supply and/or bias voltage supply applied to the electrodes of the amplifying devices; and/or subject matter under subclass 118 involving specific details or distinctive characteristics of the power or bias voltage supply of the amplifying devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

127+, for amplifiers with control of power supply or bias voltage. See the notes and search notes thereunder.

129+, for amplifiers with control of input electrode or gain control electrode bias. See the notes and search notes thereunder.

199+, for amplifier power or bias supply voltages. See the notes and search notes thereunder.

124 This subclass is indented under the class definition. Amplifier systems wherein there are at least two signal channels each containing an amplifier as defined in the class definition, (Section I).

(1) Note. For this and indented subclasses such amplifier channels may be separate; in parallel with a common source and a common load; or in branched circuit channels from separate sources or to separate loads.

(2) Note. Sum and difference amplifiers involving two or more signal inputs to the same channel or a different channel where the output is proportionally the sum or difference of the plural inputs are not classified herein. See the search notes below.

(3) Note. A balanced circuit is regarded as a single source or load for the purposes of classification in these subclasses. A push-pull amplifier is regarded as a single amplifier channel for purposes of classification in this class. Balanced circuits and push-pull amplifiers are to be found in this class.

(4) Note. The plural channels need not amplify or operate simultaneously to be classified herein. Subject matter involving plural channels with switching means to select with alternatively one or more channels to amplify a signal a classified in this or indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

3, for amplifiers having diverse type amplifying devices.

53, for amplifiers having distributed parameter coupling.

55, for amplifiers having distributed parameter coupling;

69, for sum and difference amplifiers. See (2) Note above.

70+, for amplifiers with series arranged amplifier devices.

71+, for series energized amplifier devices;
73, for plural outputs.
74, for plural separate signal inputs.
77, for push-pull amplifiers with feedback compensation for the effects of inter-electrode capacitance (e.g., neutralization).
81+, for signal feedback amplifiers having at least one push-pull stage.
84, for signal feedback amplifiers with plural amplifier channels.
116, for amplifiers with balanced-to-unbalanced coupling.
117+, for amplifiers having unbalanced-to-balanced coupling; and subclasses
118+, for amplifiers including a push-pull stage.
147, for amplifiers having plural input sources.
148, for amplifiers having plural loads.
151, for cascaded amplifiers with means to by-pass a stage.
252+, and 295, for plural semiconductor amplifier channels.
262+, 301 for semiconductor amplifiers;

SEE OR SEARCH CLASS:
307, Electrical Transmission or Interconnection Systems, subclasses 11+ and 43+ for plural load circuit and supply circuit systems respectively.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous nonlinear circuits utilizing electron tube or semiconductor devices.
333, Wave Transmission Lines and Networks, subclasses 1+ for plural channel passive network systems.
381, Electrical Audio Signal Processing and Systems, subclass 77 for program distribution systems involving distribution of a program to a plurality of local stations where the program is amplified and reproduced.

125 This subclass is indented under subclass 124. Subject matter wherein at least one of the signal channels has a D.C. conductive path from source to load, or where branched channels are involved, from or to the common junction point of the channels to the separate loads or from the separate sources or between common junction points in parallel channels; and at least one other channel has its signal transmission path, as set forth above, involves coupling circuits which will conduct only A.C. signals, because of signal coupling by a series condenser or transformer, and which will not conduct D.C. in that signal channel circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:
9, for amplifiers having periodic switching input-output comparison.
10, for modulator-demodulator type amplifiers.

126 This subclass is indented under subclass 124. Subject matter wherein at least one of the channels amplifies a signal of a different frequency from at least one other channel.

SEE OR SEARCH CLASS:
381, Electrical Audio Signal Processing Systems and Devices, subclasses 111+, for amplifier systems including microphones and/or loud speakers having plural amplifier channels which pass different frequency bands.

127 This subclass is indented under the class definition. Subject matter combined with means to control the voltage of the source of electrical energy which is supplied to the amplifying device, or combined with means to control a bias voltage applied to an electrode, such control means, generally, being applied to stabilize the power supply or bias voltage or to alter the operation of the amplifying device in a predetermined manner as, for example, to control the signal amplitude, or means to regulate the power, heater, or filament supply of the amplifying device.

(1) Note. Limiters of the active element type which "clip" the signal are not classified herein. Limiters combined with amplifiers where the bias of an electrode of the amplifier is controlled to "accommodate" a given maximum signal (where there is no clipping of the signal) are classified herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:
9, for amplifiers with periodic switching input-output comparison.

11, for amplifiers having D.C. reinsertion circuits.
51, for amplifiers combined with automatic disabling switch means.
52, for amplifiers having pilot frequency control means.
59, for amplifiers having light control or activated means.
70+, for series energized vacuum tube amplifiers.
85, for signal feedback amplifiers having an amplifier in the feedback path including the control of bias of such feedback amplifiers.
86, for signal feedback amplifiers having a separately controlled variable impedance in the feedback path.
96, for signal feedback amplifiers having bias voltage control of the signal amplifier.
113, for polyphase power supply.
114+, for unrectified A.C. power supply for an electrode.
123, for control of bias voltage or power supply voltage in push-pull amplifiers.
143, for amplifiers having a thermally responsive impedance.
144+, for amplifiers having a variable impedance for the signal path varied by a separate control path.
164, for cascaded amplifiers having an electronic tube or diode in the interstage coupling.
174, for cascaded amplifiers having an electro-mechanical transducer (e.g., piezoelectric crystal in the interstage coupling path.
179, and 180, for cascaded amplifiers having an inductance in the anode or grid circuit, or a resistance in the anode and grid circuit in the capacitance-coupled interstage coupling, respectively.
183, for cascaded amplifiers having a non-linear device in the D.C. interstage coupling path.
199+, for amplifiers with significant power or bias voltage supply.
254, and 278+, for semiconductor amplifiers having signal amplitude (volume level) control including such means where the bias is controlled.
290, for semiconductor amplifiers having D.C. feedback bias control for stabilization.
297, for series energized cascaded semiconductor amplifiers.

SEE OR SEARCH CLASS:
307, Electrical Transmission or Interconnection Systems, subclasses 31+ and 52+ for current or voltage control of electrical transmission or interconnection systems.
323, Electricity: Power Supply or Regulation Systems, for limiters of the active element type which “clip” the signal; see appropriate subclasses for voltage magnitude control systems generally.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 309+ for amplitude limiting means.
329, Demodulators, appropriate subclasses for automatic control of the bias of a demodulating element.
333, Wave Transmission Lines and Networks, particularly subclasses 2+ for automatic control of plural channel passive networks, subclass 14 for compressors and expanders, subclasses 15 and 16 for pilot signal controlled systems, subclasses 17.1+ for automatically controlled lines or networks, and subclass 81 for attenuators. See also the search Notes under these subclasses.
338, Electrical Resistors, for the structure of resistors, rheostats, and potentiometers, per se.
455, Telecommunications, subclasses 234.1 through 253.2 for automatic volume control in radio receivers; and subclasses 343.1-343.6 for particular power or bias supply for radio receivers.

128 This subclass is indented under subclass 127. Subject matter wherein the “combined control means” is in the circuit from the power supply or bias voltage source means to the anode or screen grid electrode of a vacuum tube amplifying device or in shunt therewith, in such manner, as to control the power supply or bias voltage applied to the anode or screen grid electrode.

(1) Note. Ordinary anode or screen grid resistors as such are not control means such as is classified in this subclass. However glow tubes, nonlinear resistors, diodes, vacuum tubes, etc., in the anode or screen grid supply circuit for voltage regulation and related subject matter are classified herein. Such matter involving ordinary resistors or other nonlinear impedances in the power or bias supply circuits are classified in the appropriate coupling subclass, when the particular nonlinear element affects the signal coupling, and not the power supply. Subject matter wherein such impedance is isolated from the signal path or is involved only in the power supply circuit or forms the means for isolating the power supply circuit and is not involved in signal coupling as, for example, signal by-pass means for the power supply, classification is in the appropriate subclass indented under subclass 199 below.

(2) Note. Nonlinear impedances, vacuum tube impedances, thermal impedances, etc., in amplifier circuits as indicated are classified in this class. See the search notes below.

SEE OR SEARCH THIS CLASS, SUBCLASS:

52, for pilot frequency control means which may utilize thermal or other nonlinear control means.

70+, for series energized vacuum tube amplifier devices having the anode energized through the discharge path of a controlled vacuum tube.

86, for signal feedback amplifiers having a variable impedance in the feedback path.

95, and 110, for nonlinear impedance in the cathode impedance feedback path and for a nonlinear impedance element in the loop path of feedback amplifiers respectively.

96, for feedback amplifiers combined with control of bias voltage of the signal amplifier.

123, for control of anode or screen grid voltage in push-pull amplifiers.

131, for amplifiers having a bias control voltage applied to an electrode separate and distinct from the signal input electrode.

143, for a thermally responsive impedance in the amplifier circuit (when not specifically involved in power or bias supply circuit as in subclass 128).

144+, for variable impedance for the signal channel, controlled by a separate control path, particularly subclass 145 where the variable impedance is an electron tube or a diode.

164, for amplifier interstage coupling including an electronic tube or diode.

174, for amplifiers having an electromechanical transducer (e.g., piezoelectric crystal) in an interstage coupling circuit.

183, for amplifiers having a nonlinear device in a D.C. interstage coupling.

254, and 278+, for semiconductor amplifiers including nonlinear impedance elements used for signal volume level control.

256, 272 and 289, for semiconductor amplifiers including transistor temperature control.

290, for semiconductor amplifiers having bias control D.C. feedback stabilization which may involve nonlinear impedance elements.

291, for semiconductor signal feedback amplifiers which may involve nonlinear impedance elements.

296, 297, for semiconductor cascaded amplifiers series energized for power involving bias or power supply circuitry.

299+, for semiconductor amplifiers combined with a semiconductor impedance device.

129 This subclass is indented under subclass 127. Subject matter wherein the “means to control the bias voltage” is applied to an input electrode of the amplifying device, or to an electrode separate and distinct from the signal input electrodes and in vacuum tube amplifiers also separate and distinct from the anode or screen grid electrodes in order to control the bias of such electrode.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for amplifiers having periodic switching input-output comparison.

11, for amplifiers with D.C. reinsertion circuits.

52, for amplifiers have pilot frequency control means.

85, for signal feedback amplifiers having an amplifier in the feedback path including such feedback amplifiers having means to control the bias of an input or gain control electrode, thereof.

96, for amplifiers having signal feedback with means to control the bias voltage on an electrode of the signal amplifier.

123, for bias voltage control of input or gain control electrode in push-pull amplifiers.

254, and 278+, for semiconductor amplifiers having signal volume level control.

290, for semiconductor amplifiers having D.C. feedback bias control for stabilization.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, subclasses 227 and 291 for discharge control devices for voltage magnitude control including bias control means.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 309+ for miscellaneous circuits including bias voltage control means for amplitude limiting.

333, Wave Transmission Lines and Networks, subclasses 14, 15 and 213+ for companders, pilot line controlled systems, and active element negative resistors or reactors, respectively including such subject matter with bias control means.

363, Electric Power Conversion Systems, appropriate subclasses for electrical conversion, including control of the line voltage.

455, Telecommunications, subclasses 234.1 through 253.2 for automatic volume control in radio receivers; and subclasses 343.1-343.6 for particular power or bias supply for radio receivers.

130 This subclass is indented under subclass 129. Subject matter wherein the "means to control the bias voltage" includes a source of control voltage from a system outside the amplifier system itself.

(1) Note. An example is a seismic amplifier wherein a battery not involved in supplying amplifier power or bias voltage charges an RC circuit which is applied to the control grid or an input grid of the amplifier when the shot blast is fired. Such additional means where it includes the detector or other related means of the seismic system, per se, is not classified herein. See the Search Class notes below.

(2) Note. Subject matter, wherein the control voltage is derived from a special pilot frequency voltage transmitted to the amplifier with the signal to be amplified, is not classified herein.

(3) Note. Subject matter wherein an oscillator (exclusive of any other source external to the amplifier) supplies the control bias is not classified herein. Also sources of bias voltage as such, where no cooperation from a system outside the amplifier is involved are classified with amplifiers. Where specific details of the external system are claimed as in the example under (1) Note above, as qualified in the last three lines, classification is not with amplifiers but with the external system.

SEE OR SEARCH THIS CLASS, SUBCLASS:

51, for amplifiers combined with automatic disabling switch means.

52, for subject matter, wherein the control voltage is derived from a special pilot frequency voltage transmitted to the amplifier with the signal to be amplified. See (2) Note above.

85, for amplifiers having an amplifier in the feedback path including bias control means for an electrode of such amplifier.

86, for amplifiers having a variable impedance in a feedback control path varied by a separate control path.

137, for amplifiers having bias control means including an oscillator in the control means. See (3) Note above.

143, for amplifiers having a thermally responsive impedance which may be controlled from an external control source.

144+, for amplifiers having a variable impedance for the signal channel controlled by a separate control path which may be from an external source.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 309+ for miscellaneous circuits including bias voltage control means for amplitude limiting.

333, Wave Transmission Lines and Networks, subclasses 15, 16 and 17.1+ for pilot line, pilot current and automatically controlled passive wave transmission systems.

367, Communications, Electrical: Acoustic Wave Systems and Devices, subclasses 14+, for means means where including the detector or other related means of the seismic system, per se. See (1) Note above.

455, Telecommunications, particularly subclasses 232.1+ and 341+, for similar subject matter in radio receivers.

131 This subclass is indented under subclass 129. Subject matter wherein the bias control voltage is applied to an electrode of the amplifying device separate and distinct from the electrodes to which the signal input is applied.

(1) Note. Subject matter as above in which the separate and distinct electrode to which the bias voltage is applied is the screen grid or anode of a vacuum tube amplifying device is not classified herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

128, for subject matter as above in which the separate and distinct electrode to which the bias voltage is applied is the screen grid or anode of a vacuum tube amplifying device.

132 This subclass is indented under subclass 129. Subject matter wherein the "means to control the bias voltage" is derived from the electrical signal channel through a frequency selective means.

SEE OR SEARCH THIS CLASS, SUBCLASS:

52, for pilot frequency control amplifiers including subject matter wherein the pilot control is derived from the signal channel by frequency selective means.

85, for amplifiers having an amplifier in the feedback path including those having bias voltage control which may be derived by frequency selective means.

86, for amplifiers having a variable impedance means in the signal feedback path controlled by a separate control which may be derived by a frequency selective means from the signal channel.

109, for signal feedback amplifiers having frequency responsive means in the feedback path.

143, for amplifiers having thermally responsive impedance which may be controlled by a voltage derived through a frequency selective means from the signal channel.

144+, for amplifiers having a variable impedance for the signal channel controlled by a separate control path, wherein the control voltage may be derived from the signal channel by a frequency responsive means.

133 This subclass is indented under subclass 129. Subject matter including at least two stages of amplification (each stage as defined in the class definition with at least two such stages as defined in subclass 129) such that the input signal of each stage except the first is the output signal of the preceding stage and wherein the bias control for each of at least two of the stages as defined in subclass 129 has some characteristic or characteristics distinctive from the other.

134 This subclass is indented under subclass 129. Subject matter including at least two separate and distinct bias voltage control means as therein defined, wherein the control voltages are applied to input or gain control electrodes, and which may be applied to a single amplifying device or to more than one amplifying device.

(1) Note. The two separately developed bias control means may be combined or compared or separately applied in some manner as a single bias control means to a single electrode.

135 This subclass is indented under subclass 129. Subject matter including means to limit the maximum amplitude of the bias control voltage.

SEE OR SEARCH THIS CLASS, SUBCLASS:

11, for amplifiers having D.C. reinsertion circuits.

138, for amplifiers with voltage delay for bias control where the bias control is not effective until a predetermined minimum voltage is reached where such minimum voltage is fixed by biasing a rectifier or control discharge device so that it will not conduct until such voltage is reached.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 309+ for miscellaneous circuits with amplitude limiting means.

329, Demodulators, appropriate subclasses for automatic control of the bias of a demodulating element.

136 This subclass is indented under subclass 129. Subject matter wherein "the bias control voltage" is derived from the input circuit of the amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for amplifiers having periodic switching for input-output comparison including those amplifiers wherein a bias control voltage for drift correction is developed from such comparison means.

11, for amplifiers having D.C. reinsertion circuits.

137 This subclass is indented under subclass 129. Subject matter wherein the bias voltage control means includes an oscillator which may be itself controlled by a bias voltage means and from which a signal amplifier bias voltage is derived, or from which a control voltage, usually constant, is derived.

SEE OR SEARCH THIS CLASS, SUBCLASS:

52, for amplifiers having pilot frequency control means.

130, for amplifiers including bias voltage control from a source in a system external to and independent from the amplifier. See (3) Note under subclass 130 above.

138 This subclass is indented under subclass 129. Subject matter wherein the "bias voltage control means" includes a rectifier or discharge device which is biased in such a manner that the rectifier or discharge device will not conduct until a predetermined voltage is reached, which imparts to the control means a "voltage delay" action and wherein the minimum voltage at which bias control begins may be predetermined.

SEE OR SEARCH THIS CLASS, SUBCLASS:

134, for amplifiers having plural different bias voltages provided by separate means including those with biased rectifiers or discharge devices.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 309+ for miscellaneous threshold limiters of the active element type.

139 This subclass is indented under subclass 129. Subject matter wherein "the bias voltage control means" includes an electronic tube to control the bias voltage which tube may be a gas

tube or vacuum tube having a means for control thereof while the tube is in operation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for amplifiers having periodic switching input-output comparison including those with electronic tubes for control.

11, for amplifiers having D.C. reinsertion circuits.

85, for amplifiers having amplifiers in the feedback path including bias control for the feedback amplifier.

86, for feedback amplifiers having a variable impedance in the feedback path varied by a separate control means, including those wherein the variable impedance is an electronic tube.

95, and 110, for signal feedback amplifiers with nonlinear impedance which may be an electronic tube.

96, for signal feedback amplifiers wherein the signal amplifier has bias voltage control means, including amplifiers with an electron tube in such bias control means.

114, for amplifiers with oscillators supplying or controlling the bias.

123, for push-pull amplifiers having bias voltage control means including those with electronic tubes, in the bias control means.

134, for amplifiers with plural different bias voltages including electronic tube.

138, for amplifiers controlled by biased rectifiers or discharge devices.

145, for amplifiers having an electronic tube or diode as a variable impedance for the signal channel, controlled by a separate control path.

164, for amplifiers with an electronic tube or diode in the interstage coupling. See the search notes thereunder.

296, for semiconductors amplifiers including those with other transistors for bias control.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, appropriate subclasses, for electronic tubes in voltage magnitude control circuits generally.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 530+ for miscellaneous electron tube circuits with bias control means.

333, Wave Transmission Lines and Networks, subclass 14 for amplitude compression and expansion systems, subclasses 15 and 16 for pilot signal controlled systems, 17.1+ for automatically controlled systems and 213+ for negative resistance or reactance active element networks.

140 This subclass is indented under subclass 129. Subject matter combined with a rectifier in "the bias voltage control means".

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for amplifiers having periodic switching input-output comparison.

11, for amplifiers having D.C. reinsertion circuits.

52, for pilot frequency controlled amplifiers.

85, for amplifiers having amplifiers in the feedback path including those with bias voltage control having rectifiers in the control means.

86, for amplifiers having variable impedance in the feedback path controlled by a separate control path.

95, and 110, for signal feedback amplifiers having nonlinear means which may be a diode.

96, for signal feedback amplifiers wherein the signal amplifier is provided with bias control including such bias control containing a rectifier.

123, for push-pull amplifiers including those having bias control means with rectifiers therein.

134, for amplifiers having plural different bias voltages provided by separate means including those having biased rectifiers in the control circuit.

138, for amplifiers having bias voltage control means including a biased rectifier or discharge device.

145, for amplifiers having an electronic tube or diode as a variable impedance for the signal channel controlled by a separate control path.

164, for amplifiers having a diode in the interstage coupling (see search notes under subclass 164).
254, and 278+, for semiconductor amplifiers having signal volume level control.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 330 for miscellaneous electron tube circuits with amplitude limiting and including a rectifier.
363, Electric Power Conversion Systems, appropriate subclasses for rectifier circuits.

141 This subclass is indented under subclass 129. Subject matter wherein "the bias voltage control means" includes a circuit of resistive and reactive elements, usually of resistive and capacitive elements, which serves to filter or "smooth out" the D.C. bias voltage applied for control purposes to the amplifier device and wherein specific details or distinctive characteristics of such circuit are claimed.

(1) Note. Excluded from this subclass are the resistive capacitive networks for self-biasing a vacuum tube amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:
142, for resistive capacitive networks for self-biasing a vacuum tube amplifying device
143, for amplifiers having a thermally responsive impedance element including those with separate control thereof.
144+, for variable impedance for signal channel controlled by separate control path.
199+, for amplifiers and their power or bias voltage supply.
254, and 278+, for semiconductor amplifiers having signal amplitude (volume level) control.
290, for semiconductor amplifiers having D.C. feedback for bias control.
296, and 297, for semiconductor device bias or power supply circuitry.

SEE OR SEARCH CLASS:
320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 166+ for charging or discharging a capacitor, per se.
333, Wave Transmission Lines and Networks, subclasses 138+, for passive time delay networks, subclasses 181+, for smoothing type passive filter networks.
363, Electric Power Conversion Systems, subclasses 44+ for conversion systems including D.C. smoothing filter networks.
455, Telecommunications, subclasses 234.1 through 253.2 for automatic volume control in radio receivers; and subclasses 343.1-343.6 for particular power or bias supply for radio receivers.

142 This subclass is indented under subclass 129. Subject matter involving a vacuum tube amplifying device whose input electrode bias voltage and/or bias control voltage for the same amplifying device is supplied from a resistive circuit network in the cathode to ground path of the vacuum tube amplifying device whereby the plate current flowing through such resistor, which is usually by-passed for signal current frequencies, develops a D.C. bias voltage at the cathode.

(1) Note. The subject matter in this subclass includes both adjustable self-biasing means cathode circuit self-biasing means, per se, without an adjustable feature, for vacuum tube amplifying device input electrodes. Input electrode bias means without a control feature is classified elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:
70+, for amplifiers having series energized amplifiers devices.
87+, for cathode impedance feedback.
203, and 204, for input electrode biasing. See (1) Note above.
254, and 278+, for semiconductor transistor amplifiers having signal amplitude (volume level) control.

290, for semiconductor amplifiers having D.C. bias control feedback for stabilization.

296, and 297, for semiconductor amplifiers involving bias or power supply circuitry.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 530+ for miscellaneous electron tube circuits with particular bias means.

143 This subclass is indented under the class definition. Subject matter wherein the amplifier contains in its circuit an impedance element whose impedance value is responsive to the temperature changes therein by reason of the heat generated by the current flow therethrough, or the ambient temperature of the impedance element, or whose impedance value may be changed by separate electrical control means or other heat control means.

(1) Note. Heat responsive impedance elements are species of nonlinear impedance elements and, as such, when appearing in a cathode impedance feedback circuit or generally in the loop path of a feedback amplifier are not in this subclass. Nonlinear impedances, including thermal impedances, in a feedback path which are varied by separate control means are classified elsewhere. Thermally responsive impedance means form a control means and when appearing in the voltage or power supply circuits of a push-pull amplifier are classified elsewhere in this class; and when appearing in the power supply or bias supply circuits, as for example, in the circuit from the voltage power supply to the anode or screen grid or in the bias supply circuit so as to control the bias of a vacuum tube amplifier device, classification is not herein but in the appropriate subclass of this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

86, for nonlinear impedances, including thermal impedances, in a feedback path which are varied by separate control means. See (1) Note above.

95, and 110, for heat responsive impedance elements when appearing in a cathode impedance feedback circuit or generally in the loop path of a feedback amplifier . See (1) Note above.

123, for thermally responsive impedance means forming a control means and appearing in the voltage or power supply circuits of a push-pull amplifier.

127+, when appearing in the power supply or bias supply circuits, as for example, in the circuit from the voltage power supply to the anode or screen grid or in the bias supply circuit so as to control the bias of a vacuum tube amplifier device. See (1) Note above.

144+, for variable impedance for the signal channel controlled by separate control path.

157+, appropriate subclasses thereunder for amplifier interstage coupling which may include a nonlinear device other than one thermally responsive, particularly subclass 164, for electronic tube or diode, and subclass 174, for electromechanical transducer (e.g., piezo-electric crystal) in the interstage coupling, and subclass 183, for a nonlinear device generally (other than thermally responsive) in a D.C. interstage coupling circuit.

185+, for nonlinear impedance elements, other than thermally responsive,in amplifier input circuits.

192+, for nonlinear impedance elements, other than thermally responsive, in amplifier output circuits.

256, 272 and 289+, for semiconductor amplifiers with transistor temperature control.

296, and 297, for semiconductor amplifiers involving bias or power supply circuitry.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, subclass 294 for thermally responsive impedance means for voltage magnitude control, generally.

336, Inductor Devices, appropriate subclasses for inductor structure particularly subclass 30, for condition responsive inductor adjusting means, including those responsive to thermal conditions.

338, Electrical Resistors, subclasses 20+ for resistors whose value is responsive to the current therethrough or the voltage thereacross and subclasses 25+ for resistors whose value varies in response to ambient temperature conditions.

361, Electricity: Electrical Systems and Devices, subclass 282 for thermally responsive condensers, per se.

144 This subclass is indented under the class definition. Subject matter wherein there is provided for the signal transmission path a variable impedance element or circuit which may be a variable resistance, or reactance, whose impedance is controlled by a separate control means.

(1) Note. Examples of control of variable impedances classified in this and indented subclasses are; a control voltage secured from the signal output which may be rectified, filtered and applied to a biased diode or to the control electrode of an electronic tube to vary its impedance, or to control an electric motor which may vary a potentiometer or adjustable reactance in the signal path.

(2) Note. Considering the signal coupling means as a four terminal network the "variable impedance" of the subclass may be in series between corresponding terminals or in shunt across the signal transmission path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

52, for amplifiers having pilot frequency control means.

70+, for series energized vacuum tube amplifiers.

85, for signal feedback amplifiers having an amplifier in the feedback path.

86, for signal feedback amplifiers having a variable impedance in the feedback path varied by a separate control path.

95, and 110, for signal feedback amplifiers having a nonlinear impedance in the feedback path.

96, for signal feedback amplifiers having means to control the amplifier bias voltage.

108, for potentiometer common to signal and feedback paths.

127+, for amplifiers having control of power supply or bias voltage, particularly subclasses 138, 139, and 140.

143, for thermally responsive impedance in the signal path including those varied by a voltage or other means from a separate control path.

155, for amplifiers having unicontrol coupling.

164, for cascaded amplifiers having an electronic tube or diode in an interstage coupling circuit.

174, for cascaded amplifiers having an electromechanical transducer (e.g., piezo-electric crystal) in an interstage coupling path.

183, for cascaded amplifiers having a nonlinear device in a D.C. interstage coupling.

185+, for variable impedance in amplifier input networks.

192+, for variable impedance in amplifier output networks.

293, and 296, for series energized semiconductor amplifiers.

299+, for combined diverse type semiconductors where one may be a variable impedance for the signal transmission path.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, subclasses 234 through 289 for transformer and impedance systems for voltage magnitude control.

324, Electricity: Measuring and Testing, subclasses 98, 99+, and 101 for electrical measuring and testing circuits having bridges with variable impedances thereon, which are varied by a separate control means.

333, Wave Transmission Lines and Networks, appropriate subclasses particularly subclasses 14, 15, 16, 17.1+, 81, and 213+ for wave transmission sys-

tems with variable impedance in the wave transmission path.

334, Tuners, appropriate subclasses for tuners, per se.

336, Inductor Devices, appropriate subclasses for the structure of variable inductors.

338, Electrical Resistors, appropriate subclasses for the structure of variable resistance devices.

361, Electricity: Electrical Systems and Devices, subclasses 277+ for variable condenser structure.

145 This subclass is indented under subclass 144. Subject matter wherein the variable impedance means is an electron tube, either vacuum tube or gaseous which has a control means effective during operation of the tube, or a diode.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70+, for series energized vacuum tube amplifying devices.

85, for signal feedback amplifiers having an amplifier in the feedback path.

138, 139 and 140, for amplifiers having means to control the input electrode bias voltage including respectively, biased rectifiers or discharge devices, electronic tube, or rectifier in the bias control circuit.

164, for cascaded amplifiers having an electronic tube or diode in the interstage coupling circuit.

185+, for amplifier input coupling networks which may have an electronic tube or diode as an impedance therein.

192+, for amplifier output coupling networks which may have an electronic tube or diode impedance therein.

299+, for combined diverse type semiconductors where one of the semiconductors may be a diode or transistor impedance for the signal transmission path.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, subclasses 227 and 291 for discharge devices on voltage magnitude control systems generally.

333, Wave Transmission Lines and Networks, subclasses 213+ for negative resistance and/or reactance networks of the active element type.

334, Tuners, subclasses 14+ for a tuner unit in which a reactance tube is used.

146 This subclass is indented under the class definition. Subject matter wherein the four arms of a Wheatstone bridge comprise four impedances of the amplifier circuit in such manner that at least one of the four impedances of the bridge is the discharge path of the amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

72, for series energized vacuum tube amplifying devices with at least two of the devices arranged in the arms of a bridge.

76+, for amplifiers for compensating for interelectrode impedance (neutralization) by feedback where the input-output interelectrode impedance coupling and compensating circuits may be arranged in a balanced bridge.

81, for push-pull feedback amplifiers including plural stages which may have a bridge-like arrangement.

118, for push-pull vacuum tube amplifiers including those having plural stages with a bridge-like arrangement.

175, for interstage coupling circuits including bridge networks.

273+, for push-pull semiconductor amplifiers including those with plural stages presenting a structure similar to a bridge.

293, and 296, for plural stage semiconductor amplifiers series energized which may include bridge arrangements.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, subclasses 252, 333, and 365 for various impedance bridge arrangements, for voltage magnitude or phase control; see also the search notes under the above subclasses.

333, Wave Transmission Lines and Networks, subclass 169 for wave filters having a Wheatstone bridge arrangement. See also the search notes thereunder.

147 This subclass is indented under the class definition. Subject matter wherein at least two separate and independent sources of signal energy are coupled to the input of the amplifying device.

(1) Note. Where each of the separate sources has an amplifying device in its input circuit before being jointly coupled to an amplifying device, classification is not herein.

(2) Note. The two separate sources need not operate to feed signal energy to the amplifying device simultaneously but may operate selectively, for example, as by switching the sources whereby one is feeding the amplifying device at a time.

(3) Note. A balanced circuit is treated as a single source in this class. See the definition and notes under subclass 116 above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for amplifiers having distributed parameter type coupling means.
69, for sum and difference amplifiers.
74, for series energized vacuum tube amplifiers having plural separate inputs to series devices.
84, for signal amplifiers having plural amplifier channels.
124+, see (1) Note above, also for plural separate inputs to plural channels.
185+, for amplifiers having significant input networks.
252+, for semiconductor amplifiers having plural inputs or plural channels.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclasses 18+ and 43+ for electrical transmission or interconnection systems having plural supply circuits or sources.

148 This subclass is indented under the class definition. Subject matter wherein at least two separate signal output circuits are coupled from the output electrode or element of the signal amplifying device, for coupling to separate load devices.

(1) Note. Where at least two of the signal output circuits each contain a signal amplifying device for amplifying the signal, classification is not herein but with plural signal amplifier channels.

(2) Note. Any one or more of the separate signal output circuits may be switched selectively; operation need not be simultaneous for classification in this subclass.

(3) Note. A balanced circuit is treated as a single load in this class. See definition and notes for subclass 117 above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for amplifiers having distributed parameter type coupling means.
73, for amplifiers having series energized amplifying devices having plural separate output circuits.
84, for signal feedback amplifiers having plural amplifier channels.
124+, for plural signal amplifier channel, also for separate outputs from plural channels. see (1) Note above.
192+, for amplifiers with significant signal output circuit networks.
252+, for semiconductor amplifiers with plural separate signal outputs or plural channels.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclasses 11+ for electric transmission or interconnection systems having plural load circuit systems.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous circuits having plural outputs.
329, Demodulators, subclasses 316+ for plural outputs in frequency demodulator and subclass 348 for plural outputs in an amplitude demodulator.

333, Wave Transmission Lines and Networks, subclasses 100+ for wave transmission lines and networks having branched circuits.

149 This subclass is indented under the class definition. Subject matter wherein the signal has a hum or noise component inadvertently introduced therein, as where there is ineffective filtering of a rectified A.C. power supply or bias, and wherein such objectional component is removed or reduced by the same hum or noise component introduced into the signal path of the amplifier in such manner as to oppose the objectional signal component, thereby removing it from, or reducing it in, the output signal.

(1) Note. Where such component is removed or reduced by negative feedback classification is elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:

75+, where such components of this subclass (149) are removed or reduced by negative feedback. See (1) Note above.

114, for amplifiers having unrectified A.C. power supply including those with means to eliminate hum.

118+, for push-pull amplifiers which include means for opposing noise, hum, or other unwanted components inadvertently present with the signal, and wherein the compensation is inherent in the push-pull arrangement, per se.

124+, for plural channel amplifiers including those wherein an unwanted component in the signal is separately amplified and opposes the unwanted component in a channel which includes the signal and the unwanted component.

150, for cascaded amplifying devices of different characteristics including those wherein the characteristics of one stage compensate for those of another.

151, for cascaded amplifying devices with means to by-pass a stage wherein a feed forward component may oppose the same component in the signal path.

199+, for amplifiers with power or bias voltage supply including filters to eliminate hum, etc.

296, and 297, for semiconductor amplifiers with bias or power supply circuitry.

SEE OR SEARCH CLASS:

315, Electric Lamp and Discharge Devices: Systems, subclasses 94+ for discharge device load systems having cathode or cathode heater power supply, with or without anode power supply, but excluding control electrode supply, including those having means for hum elimination, etc.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 549 for miscellaneous circuits with power supply and hum prevention or elimination means.

333, Wave Transmission Lines and Networks, subclasses 167+ for wave filters, per se, which may be used to eliminate a frequency component, particularly subclasses 181+, for smoothing filters for power supply.

363, Electric Power Conversion Systems, subclasses 39+ for electrical conversion systems including means to eliminate frequency components.

150 This subclass is indented under the class definition. Subject matter including at least two stages of amplification (each stage as defined in the class definition and each stage having a vacuum tube amplifying device) such that, the input signal for each stage, except the first, is the output signal of the preceding stage, and wherein at least one of the cascaded amplifying devices has a significant difference in its characteristics such as a difference in the number of electrodes, or where the construction of each of at least two of the tubes is such that there is a difference in the tube characteristics, or where because of differences in biasing or energizing voltages the tube characteristics are different.

(1) Note. Different types of vacuum tubes representing a genus or class and provided for above such as traveling wave tubes and magnetrons or traveling wave tubes and secondary emission tubes when claimed in cascade are classified elsewhere (see the search this class, sub-

class notes below) Where vacuum tubes, are different in structural characteristics or some other feature, but all of the plural tubes fall within one of the genus types provided for above, as for example traveling wave tubes classification is with the genus type and not in this subclass.

(2) Note. Beam power tubes, broadly claimed with no other distinctive characteristics, when combined in cascade with another vacuum tube such as an ordinary triode are classified in this subclass and not in subclass 3 or subclasses 44+ above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

3, for different types of vacuum tubes representing a genus or class and provided for above such as traveling wave tubes and magnetrons or traveling wave tubes and secondary emission tubes when claimed in cascade. Where vacuum tubes, are different in structural characteristics or some other feature, but all of the plural tubes fall within one of the genus types provided for above, as for example traveling wave tubes classification is with the genus type and not in this subclass (150) nor in subclass 3.

6, for magnetrons.

42, for traveling wave tubes and secondary emission tubes.

43, for traveling wave tubes.

70+, for series arranged vacuum tube amplifiers including cascaded amplifiers so arranged.

310+, for cascaded semiconductor amplifiers, particularly subclass 311 for cascaded semiconductors of different characteristics.

151 This subclass is indented under the class definition. Subject matter wherein means are provided to by-pass all or a part of the signal across the amplifier or of one or more stages of a cascade amplifier.

(1) Note. For classification herein the by-pass means must be free of any amplifying device. Subject matter having such additional amplifying device is not in this subclass.

(2) Note. This subclass includes subject matter involving a cascaded amplifier, for switching an amplifier device in or out of the cascaded arrangement.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for amplifiers having distributed parameter coupling means, particularly subclass 54 for distributed amplifiers.

70+, for series energized amplifiers including cascaded amplifiers having such arrangement.

84, for signal feedback amplifiers having plural amplifier channels.

88+, 92, and 98+, for cascaded amplifiers having signal feedback.

120+, for cascaded push-pull amplifiers.

124+, for by-pass means having additional amplifying device. See (1) Note above.

133, for cascaded amplifiers having different bias control for different stages.

145, for amplifiers having a separately controlled tube in the signal path.

147, and 148, for amplifiers having plural signal inputs and plural signal outputs, respectively.

157, for amplifier interstage couplings, per se, particularly subclass 164, for an electronic tube or diode in the coupling circuit.

310+, for cascaded semiconductor amplifiers.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 100+ for wave transmission passive network branched circuits.

152 This subclass is indented under the class definition. Subject matter including at least three stages of amplification (each stage as defined in the class definition) such that, the input signal for each stage, except the first, is the output signal of the preceding stage; and where two of the interstage coupling means between succes-

sive amplifying devices have different characteristics.

(1) Note. The following are examples of subject matter classified in this and indented subclasses: one device is coupled from the plate and the other from the cathode; or one coupling has a tuned circuit and the other has not; or both couplings have circuits tuned to different frequencies or the two couplings may be similar but contain an impedance element or elements of one having different values from the corresponding element, or elements in the other interstage coupling.

SEE OR SEARCH THIS CLASS, SUBCLASS:

3, for plural diverse type amplifying devices.
53+, for amplifiers having distributed parameter type coupling.
70+, for series energized vacuum tube amplifiers.
88, 92 and 98, for cascaded amplifiers including signal feedback.
120+, for interstage coupling between push-pull stages of an amplifier.
133, for different bias control on different stages of a cascaded amplifier.
150, for cascaded amplifiers with similar amplifying devices having different characteristics.
151, for amplifiers with means to by-pass a stage.
157+, for interstage coupling in an amplifier.
310+, for plural stage cascaded semiconductor amplifiers.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, appropriate subclasses for voltage magnitude and phase control systems generally, with various transformer and impedance networks to perform such functions.
333, Wave Transmission Lines and Networks, subclasses 24+ for coupling networks for wave transmission, generally.

153 This subclass is indented under subclass 152. Subject matter wherein at least one of the interstage coupling means has a cathode follower signal output.

(1) Note. If only the coupling of the last stage is a cathode follower and none of the previous stages has a cathode follower output, classification is not in this subclass. For classification of cathode follower amplifiers and analogous subject matter see search notes immediately following.

SEE OR SEARCH THIS CLASS, SUBCLASS:

119, for push-pull vacuum tube amplifiers including cathode followers.
168, and 172+, for amplifiers having a cathode follower in the interstage coupling.
193+, for amplifiers with cathode follower output coupling.
310+, for cascaded semiconductor amplifiers which may have an emitter follower stage analogous to cathode follower in a cascaded vacuum tube amplifier.

154 This subclass is indented under subclass 152. Subject matter wherein at least one of the interstage coupling means has a signal coupling transformer or a resonant circuit contained therein.

(1) Note. Stagger tuned amplifiers are classified in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

56, for amplifiers having wave guide, cavity, or concentric resonator coupling means.
120, for interstage coupling between push-pull amplifier stages including transformer coupling and resonant means in the coupling circuit.
165+, for amplifiers having transformer interstage coupling.
302+, for cascaded semiconductor amplifiers having frequency responsive signal coupling means.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 24+ for wave transmission coupling means, generally, including resonant circuits and transformer coupling.

334, Tuners, appropriate subclasses for tuners, per se, and especially subclasses 59+ and 61+ for transformers used in a resonant circuit.

155 This subclass is indented under the class definition. Subject matter wherein two or more elements such as resistors, reactors, etc.., of any coupling network or different coupling networks, for transmission of the signal in the amplifier are constructed and arranged so that adjustment or control is simultaneous for such two or more elements, such adjustment may be for a tuner, a potentiometer, or any other means or any combination of such means, in the coupling circuits or associated circuits.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, particularly subclass 56 for distributed parameter coupling means including adjustment of such means.

65+, for structure of circuit elements when in an amplifier which may include the structure of adjustable circuit elements.

108, for a potentiometer common to the signal and feedback paths of an amplifier.

116, and 117, for amplifiers with balanced-to-unbalanced and unbalanced-to-balanced coupling, respectively, which may involve adjustable circuit elements.

120, and 122, for coupling of a push-pull amplifier which may involve adjustable circuit elements in the coupling.

143, for amplifiers with a thermally responsive impedance.

144+, for amplifiers having a variable impedance for the signal channel controlled by a separate control path.

157+, for amplifiers with interstage coupling which may have an adjustable element in the coupling.

171, 190 and 197, for transformer structure.

185+, for amplifiers which may have an adjustable element in the input coupling.

192+, for amplifiers which may have an adjustable element in the output coupling.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 24+, 81 and 219+ for coupling means, attenuators, or distributed parameter type resonators, respectively, including those with variable circuit elements.

334, Tuners, appropriate subclasses for tuners, per se.

336, Inductor Devices, appropriate subclasses for variable inductor devices.

338, Electrical Resistors, appropriate subclasses for the structure of rheostats, and resistors.

361, Electricity: Electrical Systems and Devices, subclasses 277+ for variable condensers.

156 This subclass is indented under the class definition. Subject matter wherein the signal input is floating and is applied between the control grid and cathode of a vacuum tube amplifying device, with the cathode having an impedance between it and ground which maintains the cathode voltage above ground, by reason of the anode current flowing through such impedance.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70+, for series energized amplifiers including those having signal coupling between cathode and grid similar to the subject matter in this subclass.

87+, for amplifiers having cathode impedance feedback particularly subclass 89 for cathode coupling between adjacent stages.

119, for push-pull amplifiers including coupling to the cathode.

153+, for amplifiers having interstage coupling to a cathode.

186+, for amplifiers having input coupling to a cathode.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 589 for miscellaneous electron tube circuits with bootstrap circuit means.

157 This subclass is indented under the class definition. Subject matter wherein the amplifier is comprised of at least two amplifying devices in cascade, the two being in direct proximity in the cascaded circuit and wherein there are significant details or distinctive characteristics of the circuit by means of which the signal output of the preceding amplifying device is coupled to the signal input of the following cascaded amplifying device, or wherein the parameters or electrical characteristics of the output of the preceding device or the input of the following device, are claimed.

(1) Note. Subject matter disclosing interstage coupling but wherein only the output coupling of the first amplifying device is claimed or wherein only the input coupling of the following amplifying device is claimed is classified in this and appropriate indented subclasses and not with input or output coupling under subclasses 185+ or 192+, respectively.

(2) Note. The output of the preceding amplifying device of the cascaded devices has an output electrode and a common electrode for the signal and the input of the following stage has an input electrode and a common electrode, to receive the signal. Thus, there is involved a four terminal coupling network between output (including common electrode) and input (including common electrode) with usually two-series circuits between output and input electrodes and between common electrodes respectively and also shunt circuit elements often between such series circuits.

SEE OR SEARCH THIS CLASS, SUBCLASS:

3, for plural diverse type amplifying devices which may involve interstage coupling between such devices.

53+, for coupling of distributed parameter type which may be interstage.

65+, for structure of circuit elements, other than transformer structure, which may be involved in interstage coupling.

70+, for interstage coupling between cascaded series energized tubes.

88+, 92, and 98+, for interstage coupling in cascaded feedback amplifiers.

120, for interstage coupling in push-pull amplifiers.

133, for cascaded amplifiers having bias voltage control which may involve interstage coupling.

143, for thermally responsive impedance which may be involved in interstage coupling.

144+, for variable impedance controlled by separate control path which may be involved in interstage coupling.

150, for cascaded stages having amplifiers of different characteristics with interstage coupling means.

151, for cascaded stages with means to bypass a stage.

152+, for diverse types interstage coupling in amplifiers having plural cascaded stages.

155, for unicontrol of coupling means which may involve interstage coupling.

156, for bootstrap coupling.

185+, for amplifiers with input coupling networks. See (1) Note above.

192+, for amplifiers with output coupling networks. See (1) Note above.

310+, for plural stage cascaded semiconductor amplifiers, involving interstage coupling.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 24+, for passive coupling networks for wave transmission, generally.

158 This subclass is indented under subclass 157. Subject matter wherein the signal derived from the preceding cascaded amplifying device is coupled to the cathode electrode of a following cascaded vacuum tube amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

88+, and 91+, for amplifiers applying signal feedback to the cathode.

89, for amplifiers having adjacent cascaded stages with cathode-cathode coupling. See (1) Note thereunder.

119, for push-pull amplifiers with coupling to the cathode.

156, for bootstrap coupling where input signal is applied directly between grid and cathode.

186+, for input coupling to the cathode.

159 This subclass is indented under subclass 158. Subject matter wherein the interstage coupling has a D.C. conductive path for signal current from the output electrode of the preceding cascaded amplifying device to the input electrode of the following device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

187, for amplifiers with D.C. input coupling to the cathode.

160 This subclass is indented under subclass 157. Subject matter wherein the signal derived from the first of the two cascaded amplifying devices is coupled to the screen grid or an electrode other than the control grid or cathode, such as the anode electrode or the suppressor grid of the following cascaded amplifying device, which device is of the vacuum tube type.

SEE OR SEARCH THIS CLASS, SUBCLASS:

64, for space charge grid tube amplifiers wherein the first grid next to the cathode is biased positively with respect thereto and the signal input is applied to the grid next in succession from the cathode which is biased negatively with respect to the cathode.

185, and 188+, for input coupling to a vacuum tube amplifying device including input coupling to an electrode other than the control grid or cathode.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclass 124 for amplifiers combined with an electrical measuring device wherein the input is applied to the anode of the amplifying device (e.g., inverted amplifier).

161 This subclass is indented under subclass 160. Subject matter wherein the coupling has a D.C. conductive path for signal current from the output electrode of the preceding amplifying device to the input, electrode of the following of the two cascaded vacuum tube amplifying devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

191, for a D.C. amplifier input coupling which may be to an electrode of a vacuum tube amplifying device other than the control grid or cathode.

162 This subclass is indented under subclass 157. Subject matter wherein the coupling between the two cascaded amplifying devices is from a grid, such as the screen grid, suppressor grid or control grid, or from between such a grid and an anode of the preceding amplifier device (of the vacuum tube type) of the two cascaded devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

42, for amplifiers having secondary emission amplifier devices wherein the output may be from a secondary emissive electrode.

192, and 195, for output coupling from a grid, such as the screen grid, suppressor grid or control grid or between such a grid and the anode.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclass 124 for inverter amplifiers combined with measuring means where the output is from the control grid.

163 This subclass is indented under subclass 162. Subject matter wherein the coupling has a D.C. conductive signal path from the grid or from

between the grid and anode of the preceding of the two cascaded amplifying devices (of the vacuum tube type) to the following device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

198, for D.C. output coupling which may involve coupling from a grid or from between a grid and the anode.

164 This subclass is indented under subclass 157. Subject matter in which the coupling circuit between the two cascaded stages has at least one path which includes an electronic discharge tube (which may be a gas tube or vacuum tube having control means effective during operation of the tube) or which includes a diode element which may be a glow tube, a rectifier vacuum tube diode or a dry rectifier diode, etc.

(1) Note. The electronic tube or diode performs some function, such as an impedance, other than serving as an additional amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

138, for control of bias or power supply voltage by a biased rectifier or discharge device.

139, and 140, for an amplifier including an electronic tube or rectifier, respectively, to control the input or gain control electrode bias.

143, where the diode or electronic tube is a thermally responsive element.

145, where the diode or electronic tube is a variable impedance controlled by a separate control path.

185+, for amplifier input circuits including any with an electronic tube or diode, in the input circuit (other than as a preceding amplifying stage).

192+, for amplifier output networks which may include an electronic tube or diode (other than as an amplifying stage).

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 213+ for negative resistance and/or reactance networks which have an active element including electron tubes or diodes, as such active elements.

165 This subclass is indented under subclass 157. Subject matter wherein the the signal coupling between the two cascaded amplifying device stages is by means of at least one transformer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

120, for interstage coupling in push-pull amplifiers including transformer coupling.

122, for input or output coupling in push-pull amplifiers including transformer coupling.

154, for transformer coupling in plural stage cascaded vacuum tube amplifiers with at least two interstage coupling networks which have some different characteristic.

188+, for transformer coupled amplifier input circuits.

195+, for transformer coupled amplifier output circuits.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 177+ for wave transmission transformer coupled circuits of the passive type, generally.

334, Tuners, subclasses 59+ and 61+ for tuners having a transformer in the resonant circuit.

336, Inductor Devices, appropriate subclasses, for transformer structure.

166 This subclass is indented under subclass 165. Subject matter wherein, between the primary and secondary of the transformer, there is an additional capacitive or inductive reactor element which carries part of the signal current coupled between the two devices.

167 This subclass is indented under subclass 165. Subject matter wherein additional impedance which may be inductive, capacitive or resistive is included in either the primary or secondary winding circuit of the transformer which couples the signal between the two cascaded amplifier devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

189, for transformer input coupling with additional impedance connected to the primary or secondary winding circuit.

196, for transformer output coupling with additional impedance connected to the primary or secondary winding circuit.

168 This subclass is indented under subclass 165. Subject matter wherein means are provided to derive the signal from the cathode of the preceding amplifying device (of the vacuum tube type).

SEE OR SEARCH THIS CLASS, SUBCLASS:

70+, for series energized tubes which may have a cathode follower output.

88+, and 91, for cascaded amplifiers having signal feedback to the cathode.

117, for amplifiers having unbalanced-to-balanced coupling including phase splitters with cathode coupled output.

119, for push-pull amplifier involving coupling from the cathode.

153, for different interstage coupling in cascaded amplifiers including a cathode follower stage.

156, for bootstrap coupled amplifiers.

172+, for interstage coupling from the cathode for other than transformer coupling.

193, for output networks from the cathode of the amplifying device.

250+, for semiconductor amplifiers having emitter signal output analogous to cathode follower output.

169 This subclass is indented under subclass 165. Subject matter wherein means are provided for adjusting the inductance of either the primary or secondary winding or the mutual inductance between the primary and secondary winding, in the latter case, for example, by varying the position of the primary or secondary windings or parts thereof relative to each other.

SEE OR SEARCH CLASS:

334, Tuners, subclasses 61+ for tuners having mutual inductance variable means.

336, Inductor Devices, appropriate subclasses particularly subclasses 115+ for adjustable coupling by relatively moving coils, and subclasses 130+ for relatively movable coil and core to vary the inductance. Class 336 is the general class for the structure of inductors including means to vary the inductance and mutual inductance.

170 This subclass is indented under subclass 165. Subject matter combined with shielding means, for the transformer, or parts thereof.

(1) Note. Under interstage coupling, shielding and the structure of shielding are classified separately (subclass 170) from other structure of transformers (subclass 171). Under input and output coupling no separate provision is made for shielding so that all structure of transformers in input or output amplifier coupling including shielding is classified in subclasses 190 and 197, below respectively.

SEE OR SEARCH THIS CLASS, SUBCLASS:

68, for shielding combined with amplifiers or with circuit elements of amplifiers, generally.

190, for amplifier input coupling including transformer structure which may include shielding.

197, for amplifier output coupling including transformer structure which may include shielding.

SEE OR SEARCH CLASS:

174, Electricity: Conductors and Insulators, subclasses 35+, shielded or screened, for shielding electrical elements, generally. See the search notes thereunder.

336, Inductor Devices, subclasses 84+ for shielding of inductors, generally. See the search notes thereunder.

171 This subclass is indented under subclass 165. Subject matter involving the structure of the transformer coupling the signal between the two cascaded stages.

SEE OR SEARCH THIS CLASS, SUBCLASS:

65+, for structure of amplifier circuit elements other than transformers involved with an amplifier system.

190, for the structure of transformers in amplifier input coupling.

197, for the structure of transformers in amplifier output coupling.

SEE OR SEARCH CLASS:

336, Inductor Devices, appropriate subclasses for transformer structure generally.

172 This subclass is indented under subclass 157. Subject matter wherein the signal output is coupled form the cathode electrode of the preceding vacuum tube amplifier device of the two cascaded amplifying devices, to the input of the following amplifier device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70+, for series energized vacuum tube amplifiers which may have an output circuit from the cathode.

88, and 91, for cascaded vacuum tube amplifying devices with signal feedback from the cathode.

89, for amplifiers having adjacent cascaded stages with cathode-cathode coupling.

117, for amplifiers with unbalanced-to-balanced coupling including phase splitters with cathode output coupling.

119, for push-pull amplifiers with coupling from the cathode.

153, for plural stage cascaded vacuum tube amplifying devices with different coupling between stages including a cathode follower stage.

156, for bootstrap coupling.

168, for interstage transformer coupling from the cathode.

193+, for amplifier output coupling networks from the cathode of the amplifying device (cathode followers) see the notes and search notes thereunder.

250+, for semiconductor amplifiers having emitter output analogous to cathode follower output.

173 This subclass is indented under subclass 172. Subject matter wherein the coupling between the two cascaded amplifying devices is a D.C. conductive path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

194, for vacuum tube amplifier device output coupling circuits with D.C. coupling from the cathode.

174 This subclass is indented under subclass 157. Subject matter wherein the coupling circuit between the two cascaded amplifier devices includes means to convert the electric signal to mechanical vibrations and means further to convert the mechanical vibrations back to electric signals, such means, generally, serving as either time or phase delay means or means to determine the transmission frequency of the coupling network.

(1) Note. The electromechanical transducer means in this subclass is distinguished from subject matter of subclass 60 above, wherein the amplifying device itself includes a magnetostrictive means electromechanical transducer. In this subclass, the electrical signal energy is not used to control another source of electrical energy applied to the transducer, but herein the electric signal, in being transmitted, is converted to mechanical energy and back to electrical energy.

SEE OR SEARCH THIS CLASS, SUBCLASS:

60, for amplifiers having magnetostrictive means.

185+, for amplifier input circuits including any having an electromechanical transducer. See (1) Note under subclass 157.

192, for amplifier output circuits including any having an electromechanical transducer. See (1) Note under subclass 157.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 148+, 186, and 187+ for delay lines using electrome-

chanical transducers, and for wave filters using electromechanical transducers and piezo-electric types of such transducers, respectively. See the search notes under these subclasses.

175 This subclass is indented under subclass 157. Subject matter wherein the coupling includes a network having four impedance branches connected in series to form a closed circuit, two nonadjacent junction points serving as input terminals while the remaining two junction points serve as output terminals.

SEE OR SEARCH THIS CLASS, SUBCLASS:

72, for plural amplifier devices having space discharge paths in different arms of a bridge.

146, for Wheatstone bridge with amplifier in at least one arm.

185+, for amplifier input coupling including any with a lattice or Wheatstone bridge network. See (1) Note under subclass 157, above.

192+, for amplifier output coupling including any with a lattice or Wheatstone bridge network. See (1) Note under subclass 157, above.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclass 74, sections (1) and (2) of the definition.

176 This subclass is indented under subclass 157. Subject matter wherein the coupling includes a T, H, or Pi circuit network.

SEE OR SEARCH THIS CLASS, SUBCLASS:

185+, for amplifier input circuit networks including any with a T, H, or Pi circuit network. See (1) Note under subclass 157, above.

192+, for amplifier output circuit networks including any with a T, H, or Pi circuit network. See (1) Note under subclass 157, above.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 24+, appropriate subclasses thereunder for coupling circuits which may include T, H, of Pi networks. See the notes and search notes under Class 333, subclass 24.

177 This subclass is indented under subclass 157. Subject matter wherein any path traced in series from the output electrode of the preceding of the two cascaded amplifying devices to the input electrode of the amplifier device of the following stage contains at least one capacitor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

120, for push-pull amplifiers with significant interstage coupling which may include a blocking capacitor in such coupling.

166, for amplifiers with interstage transformer coupling having additional reactive coupling which may be a capacitor.

185, and 186, for amplifier capacitor input coupling, generally, and to a cathode, respectively.

192, and 193, for amplifier capacitor output coupling, generally, and from a cathode, respectively.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 24+ for coupling circuits generally, see notes and search notes under subclass 24.

178 This subclass is indented under subclass 177. Subject matter wherein the series path between the output electrode of the preceding of the two cascaded devices and the input electrode of the succeeding device has a resistor of inductance in such path in series with the coupling or blocking capacitor.

179 This subclass is indented under subclass 177. Subject matter having in addition an inductor connected to the anode output electrode of the preceding stage device or to the grid input electrode of the following stage device, in shunt across the signal transmission path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

199+, appropriate subclasses for circuits in the anode power supply or grid bias supply which may include an inductor. See the search notes under subclass 199, below.

180 This subclass is indented under subclass 177. Subject matter having in addition a resistance directly connected to the anode output electrode from the anode power supply of the preceding amplifier stage device and a resistance directly connected to the input grid electrode of the following amplifier stage device from the negative bias source or ground, each resistance being in shunt across the signal transmission path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

199+, for power or voltage supply circuits to the anode or grid electrodes which may have resistors therein. See the search notes under subclass 199, below.

181 This subclass is indented under subclass 157. Subject matter wherein the series coupling from the output electrode of the preceding amplifier device to the input electrode of the following amplifier device of the two cascaded stages has a D.C. conductive path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for periodic switching for input-output comparison including drift corrected D.C. amplifiers.
10, for modulator-demodulator amplifiers for amplifying D.C. signals.
53+, for amplifiers having distributed parameter coupling which may include D.C. interstage coupling.
70+, for series energized amplifiers.
121, for push-pull amplifiers having D.C. interstage coupling.
125, for plural amplifier channels involving a D.C. and an A.C. channel.
159, for interstage D.C. coupling to the cathode.
161, for D.C. interstage coupling to the screen grid or electrode other than control grid or cathode.
163, for D.C. interstage output coupling from a grid or between a grid and the anode.
173, for D.C. interstage coupling from the cathode.
187, for input D.C. coupling to the cathode.
191, for D.C. input coupling, generally.
194, for D.C. output coupling from the cathode.
198, for D.C. output coupling, generally.
289, for D.C. conductively coupled cascaded semiconductor amplifiers.
293, and 296, for series energized cascaded semiconductor amplifiers.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 24+ for wave transmission coupling, generally. See, also, search notes under subclass 24.

182 This subclass is indented under subclass 181. Subject matter wherein the series coupling D.C. conductive path between the output electrode of the preceding amplifying device and the input electrode of the following amplifying device contains therein a reactive element, such as an inductor or parallel to a D.C. conductive element in the series path there is a capacitive reactive element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for amplifiers with distributed parameter coupling which may involve a D.C. conductive path including a reactive element.
107, for signal feedback amplifiers having a phase shift network in the loop path.
121, for push-pull amplifiers having D.C. interstage coupling including any with series reactor element.
143, for amplifiers having a thermally responsive impedance.
144+, for amplifiers having a variable impedance in the signal path controlled by a separate control path.
166, for transformer coupled amplifier stages including a D.C. reactive ele-

ment (inductor coil) jointing the primary and secondary windings.

175, for amplifiers having a lattice or Wheatstone bridge network in the interstage coupling circuit.

176, for amplifiers having a T, H, or Pi network in the interstage coupling.

302+, for semiconductor amplifiers having frequency responsive means in the signal transmission path.

183 This subclass is indented under subclass 181. Subject matter wherein the coupling contains a device whose impedance (which may be resistive, capacitive, or inductive or any combination of these) is such that the relationship of voltage across the device to the current flow therein is nonlinear.

(1) Note. The device may be in shunt across the signal transmission path, or in the D.C. series path between the vacuum tube amplifying devices, or in any other position in the signal coupling circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

86, for signal amplifiers with a variable impedance in the feedback path which is varied by a separate control path.

95, for feedback amplifiers having a nonlinear impedance means in the cathode circuit.

110, for feedback amplifiers having a nonlinear impedance element in the loop path.

127+, for nonlinear impedances involved in circuits for the control of amplifier power supply or bias voltage.

143, for amplifiers having a thermally responsive impedance.

144+, for amplifiers having a variable impedance for the signal channel which is varied by a separate control path.

164, for cascaded amplifiers having an electronic tube or diode in an interstage coupling circuit.

174, for cascaded amplifiers having an electromechanical transducer such as a piezo-electric crystal in an interstage coupling circuit.

185, or appropriate indented subclass for a nonlinear device involved in the input coupling.

192, or appropriate indented subclass for a nonlinear device involved in the output coupling.

299+, for semiconductor amplifiers having a diverse type semiconductor, which may be a nonlinear coupling impedance.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for active solid-state devices, per se, including subclasses 115, 123 and 162 through 166 which are directed to devices involving amplification.

307, Electrical Transmission or Interconnection Systems, subclasses 401+ for nonlinear reactor systems.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous nonlinear transistor and electron tube circuits.

333, Wave Transmission Lines and Networks, appropriate subclasses for wave transmission networks which may involve nonlinear impedance elements.

338, Electrical Resistors, subclasses 13+ for nonlinear resistor elements.

361, Electricity: Electrical Systems and Devices, subclasses 271+ for structure of a capacitor which may be nonlinear.

184 This subclass is indented under subclass 181. Subject matter wherein the series coupling D.C. conductive path between the output electrode of the preceding amplifying device and the input electrode of the following amplifying device of the two cascaded amplifying devices contains therein a resistor.

185 This subclass is indented under the class definition. Subject matter involving significant detail or distinctive characteristics of the electrical circuit coupling a source of signal energy to the input of the amplifying device; or involving electrical characteristics of the source; or involving input electrical parameters of the

amplifying device to which the signal input is coupled.

(1) Note. Subject matter in which a source is claimed by name only as a specific art device, as for example, a microphone, is classified with specific art device and not with amplifiers. Subject matter in which the source device may be broadly claimed, not by name, but by some distinctive identifying feature thereof, as where the microphone source is claimed as a "means for converting sound signals", classification is not with amplifiers but with the distinctive art device.

(2) Note. The term "generator" or "oscillator" in claims, where either appears as a source of signal energy without further qualification except an electrical characteristic such as impedance, reactance etc., is treated as a generalized source of signal energy, and classification is with amplifiers. Where specific details of the generator or oscillator are claimed, classification is with the type of generator established in the claims or with oscillators in Class 331, Oscillators.

(3) Note. Amplifier subject matter disclosing an interstage coupling but wherein only the input coupling to the succeeding stage is claimed and no interstage coupling or details to establish such coupling are claimed, is not classified in this and indented subclasses. See the search this class, subclass notes below for Interstage Coupling.

SEE OR SEARCH THIS CLASS, SUBCLASS:

65+, for input coupling involving structure of any of the input circuit elements.
74, for plural inputs to series energized tubes.
106, for amplifiers having feedback in series with the input source.
108, for input coupling which may include a potentiometer therein common to the signal and feedback paths.
116, for amplifiers with balanced input involved in balanced-to-unbalanced circuits.
117, for amplifiers with unbalanced input involved in unbalanced-to-balanced circuits.
122, for push-pull amplifiers with significant input coupling.
143, for amplifiers having thermally responsive impedance which may be in the input coupling.
144, for amplifiers with variable impedance controlled by separate control path which may be in the input coupling.
147, for plural signal inputs.
157+, appropriate subclasses for input coupling involved in interstage coupling particularly subclasses 158+ and 160+. See (3) Note under this subclass above.
192, for output coupling networks.
252+, for semiconductor amplifiers with plural inputs.
275, and 301, for semiconductor amplifier devices having balanced coupling.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 24+ for passive coupling networks for wave transmission generally.
338, Electrical Resistors, appropriate subclasses for the structure of rheostats or resistors which may be used in input coupling.

186 This subclass is indented under subclass 185. Subject matter wherein the input signal is coupled to the cathode of a vacuum tube amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

88+, and 91+, for signal feedback to a cathode circuit, particularly subclass 89 for cathode-cathode coupling between adjacent stages.
119, for push-pull amplifiers involving coupling to the cathode.
156, involving coupling directly between cathode and grid.
158+, for interstage coupling to the cathode.
250+, for subject matter including semiconductor device input coupling to emitter, which may be the dual or analogue of an input coupling circuit

to the cathode electrode of a vacuum tube amplifying device.

187 This subclass is indented under subclass 186. Subject matter wherein the input coupling network has a D.C. conductive path from the source of signal energy to the cathode input electrode of the amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

159, for D.C. interstage coupling to the cathode of a vacuum tube amplifying device.

188 This subclass is indented under subclass 185. Subject matter in which the input circuit includes a transformer which couples the signal energy from the signal source to the amplifier device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

120, for interstage coupling between push-pull stages which may involve transformer coupling.
122, for input coupling for push-pull amplifiers which may involve transformer coupling.
154, for transformer coupling which may be involved in a cascaded amplifier with different interstage couplings.
165+, involving interstage transformer coupling.
195+, for output transformer coupling.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 177+ for passive wave transmission transformer coupling circuits generally.

189 This subclass is indented under subclass 188. Subject matter wherein additional impedance which may be capacitive, inductive, or resistive is included in either the primary or secondary winding circuit of the input coupling transformer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

167, for interstage transformer coupling, with additional impedance in the primary or secondary winding circuit.
195+, for output transformer coupling including additional impedance in the primary or secondary winding of the transformer coupling network.

190 This subclass is indented under subclass 188. Subject matter involving the structure of the transformer in the input coupling circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

65+, for structure of amplifier system elements other than that of the transformer.
170, for interstage transformer coupling with shielding.
171, for interstage transformer structure.
197, for structure of the transformer in the output coupling.

SEE OR SEARCH CLASS:

336, Inductor Devices, appropriate subclasses for transformer structure, per se.

191 This subclass is indented under subclass 185. Subject matter wherein the input coupling circuit has a D.C. conductive path from the signal input source to the signal input electrode of the amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for periodic switching for input-output comparison including drift corrected D.C. amplifiers.
10, for modulator-demodulator amplifiers for amplifying D.C. signals.
53+, for amplifiers having distributed parameter coupling means which may have a D.C. conductive path.
125, for plural amplifier channels involving a D.C. and an A.C. amplifier channel.
159, for interstage D.C. coupling to cathode.
161, for interstage D.C. coupling to screen grid or electrode other than control grid or cathode.
163, for D.C. interstage coupling from grid or between grid and anode.
173, for D.C. interstage coupling from cathode.
181+, for D.C. interstage coupling.

187, for cathode input D.C. coupling.
194, for D.C. coupling from cathode.
198, for D.C. output coupling.

192 This subclass is indented under the class definition. Subject matter involving significant detail or distinctive characteristics of the electrical circuit coupling the output signal from the amplifying device to a load for utilizing such signal; or involving electrical characteristics or vacuum tube parameters such as output impedance of the amplifying device or impedance of the load involved in such coupling.

(1) Note. Where the load is claimed, even broadly, or by name only as a specific electrical art device, as for example, as a loudspeaker, classification is not in this class, but with the load art device claimed. Where characteristics of the load device are claimed, which are peculiar to the disclosed electrical art device or to a specific type of electrical art device, classification is with the load art device established in the claim.

(2) Note. Subject matter wherein general electrical characteristics of the load are claimed, as for example, "a load having a variable impedance", is classified in this or indented subclasses.

(3) Note. Subject matter disclosing an interstage coupling and where only the output coupling of a preceding stage is claimed, is not classified in this and indented subclasses, although the coupling is claimed to establish an output coupling or claimed as an output coupling.

(4) Note. Subject matter wherein an amplifier combined with an oscillator as load for the amplifier are classified with amplifiers when the oscillator is claimed by name only. Where specific details of the oscillator are claimed classification is elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:
53+, for distributed parameter type output coupling.
65+, for output coupling involving structure of any of the output network circuit elements.
73, for plural outputs from series energized tubes.
105, for output coupling involving feedback from an impedance in series with the output load.
108, for output coupling including a potentiometer therein common to the signal and feedback paths.
116, for unbalanced output coupling in amplifiers having balanced-unbalanced coupling.
117, for balanced output coupling in amplifiers having unbalanced-balanced coupling.
122, for output coupling from a push-pull amplifier.
143, for thermally responsive impedance which may be in the output coupling.
144+, for variable impedance which may be in the output coupling.
157+, for interstage coupling involving coupling from the output of an amplifier device particularly subclasses 162+ for output coupling from grid or between grid and anode, subclass 168 for transformer coupling from cathode, 172+ for other interstage coupling from the cathode.
185, for input coupling networks for amplifiers.
252+, for semiconductor amplifiers having plural outputs.
275, and 301, for semiconductor amplifiers having either balanced or unbalanced output.

SEE OR SEARCH CLASS:
331, Oscillators, where specific details of the oscillator are claimed.
333, Wave Transmission Lines and Networks, subclasses 24+ for passive coupling networks for wave transmission in general.

193 This subclass is indented under subclass 192. Subject matter, wherein the output signal is coupled from the cathode electrode of a vacuum tube amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70+, for series energized vacuum tube amplifiers which may have the output coupled from the cathode of a vacuum tube amplifying device.

88+, and 91, for signal feedback coupled from the cathode particularly subclass 89 for cathode-cathode coupling of adjacent stages.

117, for unbalanced-to-balanced coupling including phase splitters having cathode coupled output.

119, for push-pull amplifiers involving coupling from the cathode.

153, for cascaded amplifiers having plural interstage couplings of different characteristics.

156, for bootstrap coupling.

168, for transformer interstage coupling from the cathode.

172+, for interstage coupling from the cathode.

250+, for semiconductor device emitter follower circuits, analogous to cathode follower circuits.

293, and 296, for series energized cascaded semiconductor amplifier devices which may have the output coupled from an emitter electrode of a transistor.

194 This subclass is indented under subclass 193. Subject matter in which the output coupling network has a D.C. conductive path from the cathode to the load.

SEE OR SEARCH THIS CLASS, SUBCLASS:

173, for D.C. coupling from the cathode involved in interstage coupling.

195 This subclass is indented under subclass 192. Subject matter in which the output circuit network includes a transformer for coupling the signal from the amplifier device to the load.

SEE OR SEARCH THIS CLASS, SUBCLASS:

120, and 122, for push-pull amplifiers which may involve transformer output coupling.

154, for transformer coupling involved in plural diverse stages of a cascaded amplifier.

165+, involving interstage transformer coupling.

188+, for input transformer coupling.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 177+ for wave transmission transformer coupling circuits in general.

334, Tuners, subclasses 59+ and 61+ for tuners having a transformer in the resonant circuit.

196 This subclass is indented under subclass 195. Subject matter where additional impedance which may be capacitive, inductive, or resistive is included in the primary or secondary winding circuit of the output coupling transformer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

167, for interstage transformer coupling with additional impedance in the primary or secondary winding circuit.

189, for input transformer coupling with additional impedance connected in the primary or secondary winding circuit.

197 This subclass is indented under subclass 195. Subject matter involving the structure of the transformer in the output coupling circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

65+, for structure of amplifier system elements other than that of the transformer.

170, for interstage transformer coupling with shielding.

171, for interstage transformer structure.

190, for input transformer structure.

SEE OR SEARCH CLASS:

336, Inductor Devices, appropriate subclasses for transformer structure, per se.

198 This subclass is indented under subclass 192. Subject matter wherein the output coupling network has a D.C. conductive path from the

output electrode of the amplifying device to the load.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for periodic switching for input-output comparison including drift corrected D.C. amplifiers.
10, for modulator-demodulator amplifiers for amplifying D.C. signals.
53+, for amplifiers having distributed parameter coupling means which may have a D.C. conductive path.
125, for plural amplifier channels involving a D.C. and an A.C. amplifier channel.
159, for interstage D.C. coupling to cathode.
161, for interstage D.C. coupling to screen grid or electrode other than control grid or cathode.
163, for D.C. interstage coupling from grid or between grid and anode.
173, for D.C. interstage coupling from cathode.
181+, for D.C. interstage coupling.
187, for cathode input D.C. coupling.
191, for D.C. input coupling.
194, for D.C. coupling from cathode.

199 This subclass is indented under the class definition. Subject matter in which the "source of electrical energy" controlled by the signal input; or biasing means applied to the "amplifying device", or the means to apply such energy or bias, such as the circuits through which such source or bias is applied; or means for isolating such source or biasing means from the signal path or other amplifier circuits (by filters, isolating resistors, or other means), is significantly claimed, and which subject matter is not provided for in any of the previous subclasses.

(1) Note. Merely claiming power supply source or biasing means by name only or broadly without significant detail or distinctive characteristics is insufficient for classification in this and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

4, for maser type amplifying devices.
5, for solid element wave propagating amplifying devices.
6, for Hall effect type means.
7, for capacitive amplifying devices.
8, for saturable reactor type amplifying devices.
41, for gas or vapor tube amplifying devices.
42, for secondary electron emission tube amplifying device.
43, for traveling wave type tube.
44+, for electron beam tube amplifying device.
47+, for magnetically influenced discharge devices, (e.g., magnetrons).
49, for vacuum tube having distributed parameter impedance characteristics.
58, for rotating dynamoelectric amplifying devices.
60, for magnetostrictive type amplifying devices.
61+, for restrictive and magnetoresistive type amplifying devices.
63, for significant power supply or biasing means combined with an amplifying device and magnetic means which controls the energy of said power supply or biasing means, or when a magnetic means is involved in some other manner in the structure of an amplifying device combined with significant power supply or biasing means.
64, for space charge grid tubes biased to operate as such.
70+, for series energized vacuum tube amplifiers and 18 for series energized semiconductor amplifiers.
113, for polyphase power supply.
114+, for unrectified A.C. power supply.
123, for amplifiers including a push-pull stage having significant bias or power supply means.
127+, for amplifiers with means to control the bias or power supply voltage.
142, for cathode self-biasing circuits.
149, for hum elimination by introduction of the hum component in the signal path in opposed phase.
296, and 297, for semi-conductor type amplifying devices when combined with significant power supply or bias means or involving related circuitry.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclasses 149+ for miscellaneous "power pack'" systems.

315, Electric Lamp and Discharge Devices: Systems, subclasses 91+ for cathode or cathode heater including anode supply circuit but not including any grid biasing circuit.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 530+ for miscellaneous circuits combined with power supply or bias means.

329, Demodulators, appropriate subclasses for demodulators with particular power supply.

359, Optics: Systems (Including Communication) and Elements, subclasses 333+ for laser amplifiers.

200 This subclass is indented under subclass 199. Subject matter where the power supply or bias means is for an amplifier comprising two or more stages of amplification.

SEE OR SEARCH THIS CLASS, SUBCLASS:

3, for plural diverse type amplifying devices which may involve power supply or bias means.

88+, 92, and 98+, for cascaded signal feedback amplifiers which may involve power supply or bias means.

123, for push-pull amplifiers, which may be cascaded, having significant bias or power supply means.

124, for plural amplifier channels which may involve cascaded amplifiers having significant power or bias supply means.

133, for different bias controls for different stages of a cascaded amplifier.

150, for cascaded amplifiers with different characteristics which may be different bias means or voltages.

152+, for cascaded amplifiers, differently coupled between stages, which may involve circuitry for the bias or power supply means also.

157+, for amplifiers with interstage coupling circuits which may involve circuitry for the bias or power supply means also.

296+, for plural stage semiconductor amplifiers involving bias or power supply circuitry.

201 This subclass is indented under subclass 200. Subject matter where the filamentary cathodes of at least one vacuum tube amplifying device of the plural stage amplifier derives its electrical heating supply either from the anode or anode power supply of one vacuum tube amplifying device stage of the plural stage amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

115, for amplifiers having unrectified A.C. power supplied to a filamentary cathode (directly heated type).

205, for similar subject matter for a filamentary cathode also involving power supply or bias means for an input electrode.

206, for power supply or bias means applied to a filamentary cathode (directly heated type), generally.

SEE OR SEARCH CLASS:

315, Electric Lamp and Discharge Devices: Systems, subclasses 94+ for power supply or power supply circuit for cathode filament or cathode heater circuit with or without anode supply but not including grid biasing supply.

202 This subclass is indented under subclass 199. Subject matter wherein the "source of electrical energy", biasing means, the circuit or means for supplying such electrical energy or bias voltage, or isolating means for such source or bias means supplies the anode of a vacuum tube amplifying device or isolates such supply for the anode from other parts of the amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70+, for series energized amplifiers.

128, for control of bias or power supply voltage with control means in anode or screen grid circuit.

157+, 185+ and 192+, appropriate subclasses thereunder for impedances from the power source to anode

involved in interstage, input, and output coupling respectively.

293+, for series energized semiconductor amplifying devices.

203 This subclass is indented under subclass 202. Subject matter where additional bias supply or isolating means are furnished for an input electrode of an amplifying device.

(1) Note. Input electrode refers to any electrode to which the electrical signal input is applied, usually the control grid physically next to the cathode, and the cathode which is, usually, also common to the input and output circuits of the amplifier, the anode being an output electrode.

(2) Note. Cathode self-biasing circuits where the bias is established by the flow of plate current through the cathode impedance are not classified herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

142, for cathode self-biasing circuits where the bias is established by the flow of plate current through the cathode impedance.

204 This subclass is indented under subclass 199. Subject matter wherein the bias supply or isolating means is furnished to or for an input electrode of a vacuum tube amplifying device.

(1) Note. Input electrode refers to any electrode to which the electrical signal input is applied, usually the control grid physically next to the cathode and the cathode which is usually, also common to the input and output circuits of the amplifier, the anode being an output electrode. In grounded grid amplifiers the relationship of cathode and anode as described above is, of course, usually reversed.

(2) Note. Cathode self-biasing circuits where the bias is established by the flow of plate current through the cathode impedance are not classified herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

142, for cathode self-biasing circuits where the bias is established by the flow of plate current through the cathode impedance.

157+, 185+ and 192+, for impedances in the input electrode bias circuit involved in interstage, input, or output coupling, respectively.

205 This subclass is indented under subclass 204. Subject matter wherein power supply, bias means or isolating means are supplied to the filamentary cathode of the vacuum tube amplifying device, as input electrode; and/or as cathode heating electrical current supply to the directly heated filamentary cathode.

SEE OR SEARCH THIS CLASS, SUBCLASS:

115, for amplifiers having unrectified A.C. power supplied to a filamentary cathode.

127, for control of emission of a cathode electrode.

201, for power supply bias means for cathode filaments in a plural stage amplifier heated by the anode current or by current from the anode supply source.

206, for power supply for a filamentary cathode generally.

SEE OR SEARCH CLASS:

315, Electric Lamp and Discharge Devices: Systems, subclasses 94+ for power supply or power supply circuit for cathode filament or cathode heater circuit with or without anode supply but not including grid biasing supply.

206 This subclass is indented under subclass 199. Subject matter which may include the heater current supply for a filamentary cathode of a vacuum tube amplifying device not classified in any preceding subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

115, for amplifiers having unrectified A.C. power supplied to a filamentary cathode.

127, for control of emission of a cathode electrode.
201, for power supply bias means for cathode filaments in a plural stage amplifier heated by the anode current or by current from the anode supply source.
205, for similar subject matter for a filamentary cathode also involving power supply or bias means for an input electrode.

SEE OR SEARCH CLASS:
315, Electric Lamp and Discharge Devices: Systems, subclasses 94+ for power supply or power supply circuit for cathode filament or cathode heater circuit with or without anode supply but not including grid biasing supply.

207 This subclass is indented under the class definition. Subject matter not provided for in any of the subclasses above.

250 WITH SEMICONDUCTOR AMPLIFYING DEVICE (E.G., TRANSISTOR):
This subclass is indented under the class definition. Subject matter in which the amplifying device is a semiconductor.

(1) Note. Semiconductors are those materials which have a specific resistance, for example, of the order of that of germanium, silicon, selenium, etc. Subject matter including insulators which are in operation reduced to specific resistance values of the aforesaid range, by alpha or electron bombardment, heat or other means so they act in the circuit, broadly, as semiconductors, are classified in this or appropriate indented subclasses.

(2) Note. For specific types of amplifier devices in amplifiers, which may include a semiconductor material, see the pertinent subclass for the particular semiconductor device involved in this class.

(3) Note. For vacuum tube amplifier device, amplifier circuits similar or related to semiconductor amplifier device circuits, see below the appropriate subclass and indented subclasses for such circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:
3, for combined plural diverse amplifying-type devices, where one of the amplifying devices is of the semiconductor type.
4, for master-type amplifying devices wherein the master excited substance is a semiconductor.
4.9, for parametric semiconductor amplifiers.
5, for solid element wave propagating amplifying devices wherein the solid element is a semiconductor.
6, for Hall effect-type semiconductor amplifying devices wherein the Hall effect material is a semiconductor.
7, for capacitive amplifying devices, some of which may have semiconductor properties.
9, for amplifier systems with periodic switching input-output comparison of signal which may have a semiconductor amplifying device.
10, for modulator-demodulator amplifier systems which may have semiconductor amplifier devices.
11, for amplifiers having D.C. reinsertion circuits which may include a semiconductor amplifying device.

SEE OR SEARCH CLASS:
257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses integrated circuit structure with active solid-state devices, especially subclasses 115, 123, and 157 through 161 for regenerative type devices with amplification means, and subclasses 446 and 499+ for integrated circuit devices with electrically isolated components.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous nonlinear conductor device (e.g., transistor) circuits. See search notes.
329, Demodulators, appropriate subclasses for demodulators utilizing transistor elements.

361, Electricity: Electrical Systems and Devices, for transistor circuits with electric relays or electromagnetic loads.
438, Semiconductor Device Manufacturing: Process, appropriate subclass for methods of making semiconductor electrical devices.

251 Including class D amplifier:
This subclass is indented under subclass 250. Subject matter including an amplifier which utilizes switching-mode techniques.

SEE OR SEARCH THIS CLASS, SUBCLASS:
9, and 10, for amplifiers which may use switching amplifiers as a subcircuit thereof.
207, for amplifiers using switching-mode techniques.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 365+ for transistors used in a switching mode.

252 Including differential amplifier:
This subclass is indented under subclass 250. Subject matter including an amplifier having two similar input circuits so connected that they respond to the difference between two voltages or currents, but effectively suppress like voltages or currents.

SEE OR SEARCH THIS CLASS, SUBCLASS:
69, for tube-type amplifiers functioning in a differential mode.

253 Having field effect transistor:
This subclass is indented under subclass 252. Subject matter wherein a field effect transistor (FET) is utilized in the circuit with the differential amplifier.

(1) Note. A field effect transistor (FET) is a semiconductor device in which the resistance between two terminals, the source and drain, depends on a field produced by a voltage applied to the third terminal, the gate.

(2) Note. The field may modulate a depletion region, as in a junction FET, or it may cause a conductivity change in a channel, as in a MOS-FET.

SEE OR SEARCH THIS CLASS, SUBCLASS:
264, for FET in combination with push-pull utilized in complementary symmetry.
269, for FET in combination with push-pull amplifier.
277, for FET in other transistor amplifiers.
300, for FET in combined diverse-type circuit.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 581 for field-effect transistors used in miscellaneous circuits.

254 Having gain control means:
This subclass is indented under subclass 252. Subject matter including circuitry which controls the amplification of the applied signal.

(1) Note. Gain is any increase in power when a signal is transmitted from one point to another.

SEE OR SEARCH THIS CLASS, SUBCLASS:
278+, for other semiconductor amplifiers with gain control.

SEE OR SEARCH CLASS:
348, Television, subclasses 645+ for color television circuits having gain control.

255 Having push-pull amplifier stage:
This subclass is indented under subclass 252. Subject matter including an amplifier which has two identical signal branches connected so as to operate in phase opposition and with input and output connections, each balanced to ground.

SEE OR SEARCH THIS CLASS, SUBCLASS:
77, for push-pull amplifiers with feedback neutralization.

81+, for push-pull amplifiers with feedback.
118+, for vacuum tube amplifiers including a push-pull stage.
262, for push-pull amplifiers not in combination with differential amplifiers.

256 Having temperature compensation means:
This subclass is indented under subclass 252. Subject matter wherein temperature compensating means are utilized to protect or stabilize the amplifying device from changes in the ambient temperature.

(1) Note. Changes in the ambient temperature can change the operating characteristics of the amplifier and thereby change the output signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:
266, for temperature compensation in complementary push-pull amplifiers.
272, for temperature compensation in a push-pull amplifier.
289, for temperature compensation in other transistor amplifiers.

257 Having current mirror amplifier:
This subclass is indented under subclass 252. Subject matter wherein an amplifier having a gain which is substantially independent of the individual common emitter forward current gains of its component transistor, is utilized.

SEE OR SEARCH THIS CLASS, SUBCLASS:
288, for current mirror amplifier in other transistor amplifiers.

258 Having common mode rejection circuit:
This subclass is indented under subclass 252. Subject matter wherein means are utilized which ignore a signal that appears simultaneously and in phase at both input terminals.

SEE OR SEARCH THIS CLASS, SUBCLASS:
69, for differential amplifiers which may include a common mode rejection circuit.

259 Having D.C. feedback bias control for stabilization:
This subclass is indented under subclass 252. Subject matter including a feedback circuit for direct currents for the purpose of operating point stabilization.

SEE OR SEARCH THIS CLASS, SUBCLASS:
9, for amplifiers with periodic switching for input-output comparison including those having feedback circuits for drift correction, etc.
270, for D.C. feedback in push-pull complementary symmetry amplifiers.
290, for D.C. feedback in other transistor amplifiers.

260 Having signal feedback means:
This subclass is indented under subclass 252. Subject matter wherein a portion of the electrical signal output energy is applied to the input of the amplifier.

(1) Note. There is a shared impedance for the input and output circuits involved.

(2) Note. The amplifier in this subclass may be any stage or group of stages of a cascaded amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:
9, for amplifiers with periodic switching input-output comparison including those with feedback circuits.
75+, appropriate subclasses for vacuum tube signal feedback amplifiers.
265, for signal feedback in complementary push-pull amplifiers.
271, for signal feedback in push-pull amplifier.
282, for signal feedback in gain control circuit.
291, for feedback in other transistor amplifiers.

261 Having particular biasing arrangement:
This subclass is indented under subclass 252. Subject matter with specific details or distinctive characteristics of the biasing means applied to the amplifying device.

(1) Note. Merely claiming biasing means or bias filter by name only, or broadly without significant detail or distinctive characteristics, is insufficient for classification in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

199+, for particular biasing in other amplifiers.
267, for particular biasing in combination with complementary symmetry.
273, for particular biasing in combination with a push-pull amplifier.
285, for particular biasing in gain control means.
296, for particular biasing in other transistor amplifiers.

262 Including push-pull amplifier:

This subclass is indented under subclass 250. Subject matter including at least one push-pull amplifier.

(1) Note. See the Glossary in this class for the definition of "Push-Pull Amplifier".

SEE OR SEARCH THIS CLASS, SUBCLASS:

77, for push-pull amplifiers with feedback neutralization.
81+, for push-pull amplifiers with feedback.
118+, for vacuum tube amplifiers including a push-pull stage.
255, for push-pull amplifiers in combination with differential amplifiers.

263 Having complementary symmetry:

This subclass is indented under subclass 262. Subject matter wherein semiconductor devices of opposite conductivity are utilized.

(1) Note. Complementary symmetry is an arrangement of NPN and PNP transistors that provide push-pull operation from one input signal.

(2) Note. There are two complementary types of conductivity in semiconductors: The N-type where conduction is largely by electrons; and the P-type where conduction appears to be largely carried by positive charges (i.e., holes). In junction transistors which consist of zones of more than one conductivity type of semiconductor material, the conductivity is determined by the control zone so that the PNP-type junction transistor is equivalent to an N-type semiconductor body or an N-type point contact semiconductor device and an NPN junction type similarly equivalent to a P-type of semiconductor device of a single conductivity type of material.

264 And field effect transistor:

This subclass is indented under subclass 263. Subject matter wherein a field effect transistor (FET) is utilized in the circuit.

(1) Note. A field effect transistor (FET) is a semiconductor device in which the resistance between two terminals, the source and drain, depends on a field produced by a voltage applied to the third terminal, the gate.

(2) Note. The field may modulate a depletion region, as in a junction FET, or it may cause a conductivity change in a channel, as in a MOS-FET.

SEE OR SEARCH THIS CLASS, SUBCLASS:

253, for FET in combination with differential amplifiers.
269, for FET in combination with push-pull amplifiers.
277, for field effect transistors in other transistor amplifiers.
300, for field effect transistors in combined diverse-type semiconductor devices.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 581 for miscellaneous circuits using field-effect transistors.

265 And feedback means:

This subclass is indented under subclass 263. Subject matter wherein a portion of the amplifier stage output signal is returned to the input of the amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:
260, for signal feedback in differential amplifiers.
271, for signal feedback in push-pull amplifiers.
282, for signal feedback in gain control circuits.
291, for signal feedback in other transistor amplifiers.

266 And temperature compensation:
This subclass is indented under subclass 263. Subject matter wherein temperature compensating means are utilized to protect or stabilize the amplifying device from changes in the ambient temperature.

(1) Note. Changes in the ambient temperature can change the operating characteristics of the amplifier and thereby change the output signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:
256, for temperature compensation in differential amplifiers.
272, for temperature compensation in a push-pull amplifier.
289, for temperature compensation in other transistor amplifiers.

267 And particular biasing arrangement:
This subclass is indented under subclass 263. Subject matter with specific details or distinctive characteristics of the biasing means applied to the amplifying device.

(1) Note. Merely claiming biasing means or bias filter by name only, or broadly without significant detail or distinctive characteristics, is insufficient for classification in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
199+, for particular biasing in general.
261, for particular biasing in combination with a differential amplifier.
273, for particular biasing in combination with a push-pull amplifier.
285, for particular biasing in gain control circuits.
296, for particular biasing not in combination in any of the aforementioned.

268 To eliminate crossover distortion:
This subclass is indented under subclass 267. Subject matter wherein distortion which occurs at the points of operation where the input signals cross over the zero reference points is eliminated.

SEE OR SEARCH THIS CLASS, SUBCLASS:
274, for means to eliminate crossover distortion in noncomplementary, symmetry push-pull amplifiers.

269 Having field effect transistors:
This subclass is indented under subclass 262. Subject matter wherein a field effect transistor (FET) is utilized in the circuit.

(1) Note. A field effect transistor (FET) is a semiconductor device in which the resistance between two terminals, the source and drain, depends on a field produced by a voltage applied to the third terminal, the gate.

(2) Note. The field may modulate a depletion region, as in a junction FET, or it may cause a conductivity change in a channel, as in a MOS-FET.

SEE OR SEARCH THIS CLASS, SUBCLASS:
253, for FET in combination with a differential amplifier.
264, for FET in complementary symmetry in push-pull.
277, for FET in other transistor amplifiers.
300, for FET in combined diverse-type circuit.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 581 for miscellaneous circuits using field-effect transistors.

270 Having D.C. feedback bias control for stabilization:

This subclass is indented under subclass 262. Subject matter with a feedback circuit for direct currents, for the purpose of operating point stabilization.

(1) Note. Included here are devices for compensating for changes in temperature, aging, etc., of the semiconductor device, or devices which may include means such as bypass capacitors to eliminate signal feedback.

(2) Note. This does not include a mere bypassed emitter resistor unless D.C. derived therefrom is applied to another electrode.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for amplifiers with periodic switching for input-output comparison including those having feedback circuits for drift correction, etc.
259, for D.C. feedback in combination with a differential amplifier.
290, for D.C. feedback in other transistor amplifiers.

271 Having signal feedback means:

This subclass is indented under subclass 262. Subject matter wherein a portion of the electrical signal output energy is applied to the input of the amplifier.

(1) Note. There is a shared impedance for the input and output circuits involved.

(2) Note. The amplifier of this subclass may be any stage or group of stages of a cascaded amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for amplifiers with periodic switching input-output comparison including those with feedback circuits.
75+, appropriate subclasses for vacuum tube signal feedback amplifiers.
265, for feedback in complementary push-pull amplifiers.
282, for signal feedback in gain control circuits.
291, for feedback in other transistor amplifiers.

272 Having temperature compensating means:

This subclass is indented under subclass 262. Subject matter wherein temperature compensating circuits or devices are utilized to protect or stabilize the semiconductor amplifying devices from changes in the ambient temperature.

(1) Note. Changes in the ambient temperature of a circuit's environment can change the operating characteristics of the semiconductor amplifying device and thereby change the output signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:

256, for temperature compensation in a differential amplifier.
266, for temperature compensation in complementary push-pull amplifiers.
289, for temperature compensation in other transistor amplifiers.

273 Having particular biasing arrangement:

This subclass is indented under subclass 262. Subject matter with specific details or distinctive characteristics of the biasing means applied to the amplifying device.

(1) Note. Merely claiming biasing means or bias filter by name only, or broadly without significant details or distinctive characteristics, is insufficient for classification in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

199+, for particular biasing in general.
261, for particular biasing in combination with a differential amplifier.
267, for particular biasing in combination with complementary symmetry.
285, for particular biasing in gain control circuits.
296, for particular biasing in other transistor amplifiers.

274 To eliminate crossover distortion:
This subclass is indented under subclass 273. Subject matter wherein distortion which occurs at the points of operation where the input signals cross over the zero reference points is eliminated.

SEE OR SEARCH THIS CLASS, SUBCLASS:
268, for means to eliminate crossover distortion in complementary symmetry.

275 Having balanced to unbalanced circuitry and vice versa:
This subclass is indented under subclass 262. Subject matter wherein one of the signal input means or signal output means is coupled to or from the semiconductor amplifier by a balanced circuit, the other signal coupling means coupled to or from the semiconductor amplifier balanced circuit.

(1) Note. For the definition of a "Balanced Circuit", see the class definition, Glossary.

SEE OR SEARCH THIS CLASS, SUBCLASS:
301, for balanced to unbalanced circuits and vice versa in other transistor amplifiers.

276 Having transformer:
This subclass is indented under subclass 262. Subject matter wherein a transformer is included in the circuit.

(1) Note. The transformer can be in the input, output, interstage, or any combination of the aforementioned.

277 Including field effect transistor:
This subclass is indented under subclass 250. Subject matter wherein a field effect transistor (FET) is utilized in the amplifier circuit.

(1) Note. A field effect transistor (FET) is a semiconductor device in which the resistance between two terminals, the source and drain, depends on a field produced by a voltage applied to the third terminal, the gate.

(2) Note. The field may modulate a depletion region, as in a junction FET, or it may cause a conductivity change in a channel, as in a MOS-FET.

SEE OR SEARCH THIS CLASS, SUBCLASS:
253, for FET in differential amplifiers.
264, for FET in combination with push-pull utilized in complementary symmetry.
269, for FET in combination with push-pull amplifiers.
300, for FET in combined verse-type circuit.

278 Including gain control means:
This subclass is indented under subclass 250. Subject matter including circuitry which controls the amplification of the applied signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:
52, for amplifiers having pilot frequency control means.
96, for feedback amplifiers combined with control of bias voltage of a signal amplifier.
123, for push-pull amplifiers having significant power or bias supply circuits including those with bias control means.
127+, for amplifiers with control of power supply or bias voltage.
143, for amplifiers having a thermally responsive impedance.
144+, for amplifiers having a variable impedance in the signal path varied by a separate control path.
155+, for amplifiers having unicontrol of coupling or associated circuits including unicontrol of signal input or output potentiometers, etc..
157+, 185+ and 192+, for interstage input or output coupling, respectively, including variable impedance means in such coupling.
254, for gain control means in combination with a differential amplifier.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, particularly subclasses 14, 16, and 17.1 for combined amplifier compressor and expander means, pilot controlled means, and automatically controlled systems, respectively; subclasses 24+ for coupling networks which may include signal amplitude control means; subclasses 213+ for negative resistance and/or reactance networks of the active element type; and subclass 81 for attenuators.

455, Telecommunications, subclasses 232.1+ for volume control, especially subclasses 234.1+ for automatic volume control.

279 And significant control voltage developing means:

This subclass is indented under subclass 278. Subject matter including specific details or distinctive characteristics of the gain control developing means.

SEE OR SEARCH THIS CLASS, SUBCLASS:

127+, 143 and 144+, for other amplifiers having gain control systems which may have significant control voltage developing means.

SEE OR SEARCH CLASS:

455, Telecommunications, subclasses 232.1+ for receivers which may have significant control voltage developing means as part of a gain control system.

280 With delay means:

This subclass is indented under subclass 279. Subject matter including circuit means which impart to the control voltage, a minimum level at which the control voltage developing means begins to function.

SEE OR SEARCH THIS CLASS, SUBCLASS:

127+, 143 and 144+, for gain-controlled amplifiers which may have delay means.

SEE OR SEARCH CLASS:

455, Telecommunications, subclasses 242.1+ for gain-controlled receivers which may have delay means.

281 With time constant means:

This subclass is indented under subclass 279. Subject matter including a circuit for filtering the control voltage, and wherein specific details or distinctive characteristics of such circuit are claimed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

127+, 143 and 144+, for amplifiers which may include time-constant means in the control voltage path thereof.

SEE OR SEARCH CLASS:

455, Telecommunications, subclasses 239.1+ for gain-controlled receivers which may include time-constant means in the control voltage path thereof.

282 Having feedback means acting as variable impedance:

This subclass is indented under subclass 278. Subject matter including a feedback means acting as a variable impedance to control the gain of the amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

86, for amplifiers having variable impedance in feedback path varied by separate control path.

283 Having emitter degeneration:

This subclass is indented under subclass 282. Subject matter including a feedback means acting as a variable impedance in the common electrode of the amplifier to control the gain of the amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

95, for amplifiers having nonlinear impedance means in the cathode impedance feedback path.

284 Having attenuation means in signal transmission path:

This subclass is indented under subclass 278. Subject matter having attenuation means in signal transmission path that controls the gain of the amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

52, for amplifiers having pilot frequency control means.

143, for amplifiers having thermally responsive means.

144+, for amplifiers having variable impedance for signal channel controlled by separate control path.

SEE OR SEARCH CLASS:

455, Telecommunications, subclass 249.1 for gain-controlled receiver having variable impedance in the control circuit.

285 Having particular biasing means:

This subclass is indented under subclass 278. Subject matter having specific details or distinctive characteristics of a biasing means for applying a biasing voltage to the amplifying device.

(1) Note. Merely claiming biasing means or bias filter by name only, or broadly without significant detail or distinctive characteristics, is insufficient for classification in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

127+, for amplifiers with control of power supply or bias voltage.

199+, for particular biasing in other amplifiers.

261, for particular biasing in differential amplifiers.

267, for particular biasing in combination with complementary symmetry.

273, for particular biasing in combination with a push-pull amplifier.

285, for particular biasing in gain control circuits.

296, for particular biasing in other transistor amplifiers.

286 Including distributed parameter-type coupling:

This subclass is indented under subclass 250. Subject matter including coupling means which has both distributive capacitance and distributive inductance at high frequencies.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for amplifiers having distributed-type coupling.

SEE OR SEARCH CLASS:

331, Oscillators, subclasses 56+ for oscillators having distributed parameter resonator.

333, Wave Transmission Lines and Networks, subclasses 219+ for distributed parameter resonator, and subclasses 236+ for long lines having distributed parameters.

287 Of diode type:

This subclass is indented under subclass 286. Subject matter including amplifying means of the diode type.

SEE OR SEARCH CLASS:

331, Oscillators, subclass 107 for diode-type oscillators.

288 Including current mirror amplifier:

This subclass is indented under subclass 250. Subject matter wherein an amplifier having a gain which is substantially independent of the individual common emitter forward current gains of its component transistor is utilized.

SEE OR SEARCH THIS CLASS, SUBCLASS:

257, for current mirror amplifiers in combination with differential amplifiers.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 530+ for miscellaneous transistor circuits used for power supply or bias regulation.

289 Including temperature compensation means:

This subclass is indented under subclass 250. Subject matter wherein temperature compensating means are utilized to protect or stabilize the amplifying device from changes in the ambient temperature.

(1) Note. Changes in the ambient temperature can change the operating characteristics of the amplifier and thereby change the output signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:

256, for temperature compensation in a differential amplifier.
266, for temperature compensation in complementary push-pull amplifiers.
272, for temperature compensation in a push-pull amplifier.

290 Including D.C. feedback bias control for stabilization:

This subclass is indented under subclass 250. Subject matter with feedback circuit for direct currents, for the purpose of operating point stabilization as compensating for changes in temperature, aging, etc., of the semiconductor device, or devices, which may include means such as bypass capacitors to eliminate signal feedback.

(1) Note. This does not include a mere bypass emitter resistor unless D.C. derived therefrom is applied to another electrode.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for amplifiers with periodic switching for input-output comparison including those having feedback circuits for drift correction, etc.
97, for amplifiers including D.C. path for signal feedback.
259, for D.C. feedback in differential amplifiers.
270, for D.C. feedback in push-pull complementary symmetry amplifiers.

291 Including signal feedback means:

This subclass is indented under subclass 250. Subject matter wherein a portion of the electrical signal output energy is applied to the input of the amplifier.

(1) Note. There is a shared impedance for the input and output circuits involved.

(2) Note. The amplifier of this subclass may be any stage or group of stages of a cascaded amplifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9, for amplifiers with periodic switching input-output comparison including those with feedback circuits.
75+, appropriate subclasses for vacuum tube signal feedback amplifiers.
260, for signal feedback in differential amplifiers.
265, for feedback in complementary push-pull amplifiers.
271, for signal feedback in push-pull amplifiers.
282, for signal feedback in gain control circuits.

292 Having compensation for interelectrode impedance:

This subclass is indented under subclass 291. Subject matter wherein signal feedback means are provided for, compensating for, or nullifying the undesirable feedback caused by any of the internal interelectrode impedances of the semiconductor amplifying device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

76+, for neutralization through compensation by signal feedback of the effects of interelectrode impedance in vacuum tube amplifiers.

293 Having negative feedback:

This subclass is indented under subclass 291. Subject matter wherein the signal feedback which is superimposed on the input signal has at least one component thereof opposite in phase to the input signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:
75+, for signal feedback in other amplifiers.

294 Having frequency responsive means or phase shift means in the feedback path:
This subclass is indented under subclass 291. Subject matter having frequency-responsive means or phase-shift means in the feedback path that causes corresponding changes in amplifier gain.

SEE OR SEARCH THIS CLASS, SUBCLASS:
107, and 109, for amplifiers having frequency- or phase-responsive means in the feed-back path.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 113+ for miscellaneous frequency control, subclasses 231+ for a phase shift of less than an input signal period, subclasses 2+ for phase discriminating without subsequent control, and subclasses 39+ for frequency discriminating without subsequent control.

295 Including plural amplifier channels:
This subclass is indented under subclass 250. Subject matter having more than one signal transmission path, each of which contains an amplifier (e.g., plural inputs or plural outputs).

SEE OR SEARCH THIS CLASS, SUBCLASS:
84, for signal feedback amplifiers having plural channels.
124+, for amplifiers having plural amplifier channels.
147, for amplifiers having plural separate inputs.
148, for amplifiers having plural separate outputs.

296 Including particular biasing arrangement:
This subclass is indented under subclass 250. Subject matter with specific details or distinctive characteristics of the biasing means applied to the amplifying device.

(1) Note. Merely claiming biasing means or bias filter by name only, or broadly without significant detail or distinctive characteristics, is sufficient for classification in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
199+, for particular biasing in other amplifiers.
261, for particular biasing in differential amplifiers.
267, for particular biasing in combination with complementary symmetry.
273, for particular biasing in combination with push-pull amplifier.
285, for particular biasing in signal amplitude control.

297 Including particular power supply circuitry:
This subclass is indented under subclass 250. Subject matter including specific details or distinctive characteristics of the source of electrical energy applied to the semiconductor amplifying device.

(1) Note. This includes means to apply such energy source, the circuits through which such source is applied, and means for isolating such source from the signal path or other amplifier circuits.

(2) Note. Merely claiming power supply source by name only, or broadly without significant detail or distinctive characteristics, is insufficient for classification in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
199+, for amplifiers generally involving bias or power supply. See the search notes under subclass 199.

298 Including protection means:
This subclass is indented under subclass 250. Subject matter including circuits or devices for protecting the amplifying means.

SEE OR SEARCH THIS CLASS, SUBCLASS:
207+, for amplifiers having protection circuitry.

299 Including combined diverse-type semiconductor device:

This subclass is indented under subclass 250. Subject matter including plural semiconductor devices and at least one semiconductor device which is different in its physical characteristics or in materials, and which also amplifies the signal.

(1) Note. Materials which may be a diode of the nonamplifying type, or which may be an additional signal carrier semiconductor amplifying device including an amplifier not previously provided for in this schedule.

SEE OR SEARCH THIS CLASS, SUBCLASS:

94, and 110, for vacuum tube feedback amplifiers having nonlinear impedance elements.

138, and 140, for amplifiers having a rectifier, which may be a semiconductor diode, in a bias control circuit for the input or gain control electrode.

143, for vacuum tube amplifiers having a thermally responsive impedance.

144+, for vacuum tube amplifiers having a separately controlled variable impedance in the signal path, which may be a semiconductor.

164, for vacuum tube amplifiers with a diode in the interstage coupling which may be a semiconductor.

174, for a piezoelectric crystal or electromechanical transducer broadly in the interstage coupling of a vacuum tube amplifier.

183, for vacuum tube amplifiers having D.C. interstage coupling with a nonlinear device therein.

300 Bipolar or unipolar (FET):

This subclass is indented under subclass 299. Subject matter wherein the additional semiconductor device may be a bipolar or unipolar transistor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

253, for field effect transistor (FET) in combination with a differential amplifier.

264, for FET in combination with complementary symmetry push-pull amplifiers.

269, for FET in combination with other push-pull amplifiers.

277, for other field effect transistors.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 581 for miscellaneous FET circuits.

301 Including balanced to unbalanced circuits and vice versa:

This subclass is indented under subclass 250. Subject matter wherein one of the signal input means or signal output means is coupled to or from the semiconductor amplifier by a balanced circuit, the other signal coupling means coupled to or from the semiconductor amplifier unbalanced circuit.

(1) Note. For the definition of a “Balanced Circuit”, see the Glossary in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

275, for balanced to unbalanced circuits in push-pull amplifiers.

302 Including frequency-responsive means in the signal transmission path:

This subclass is indented under subclass 250. Subject matter including frequency-responsive means in the signal transmission path that causes corresponding changes in the amplifier gain.

SEE OR SEARCH THIS CLASS, SUBCLASS:

157+, 185+ and 192+, for interstage input or output coupling, respectively, including variable impedance means in such coupling.

294, having frequency-responsive means or phase-shift means in the feedback path.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 113+ for miscellaneous frequency control, subclasses 231+

for a phase shift of less than an input signal period, subclasses 2+ for phase discriminating without subsequent control, and subclasses 39+ for frequency discriminating without subsequent control.

333, Wave Transmission Lines and Networks, subclasses 24+ for frequency or phase sensitive circuits in wave transmission lines and networks.

303 Including an active device in the filter means:

This subclass is indented under subclass 302. Subject matter including a transistor or active diode in the filter network.

SEE OR SEARCH THIS CLASS, SUBCLASS:

107, 109 and 294, for circuits having frequency-responsive means or phase-shift means in the feedback path.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 552+ for miscellaneous circuits suppressing an unwanted signal using an active filter.

333, Wave Transmission Lines and Networks, subclasses 24+ for frequency or phase sensitive circuits in wave transmission lines and networks.

304 And equalizing means:

This subclass is indented under subclass 302. Subject matter including a network connected to a line to correct or control its transmission frequency characteristics.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclass 28 for equalizers used in wave transmission lines and networks.

305 And tuning means:

This subclass is indented under subclass 302. Subject matter including a manually adjustable frequency selecting means.

SEE OR SEARCH CLASS:

334, Tuners, appropriate subclasses for tuning circuits.

455, Telecommunications, subclasses 120+ for transmitters having tuning means; and subclasses 150.1+ for receivers having tuning means.

306 And bandpass, broadband (e.g., wideband), or sidepass means:

This subclass is indented under subclass 302. Subject matter including means which determines the range of the frequencies of the applied signal that will be amplified.

SEE OR SEARCH CLASS:

455, Telecommunications, subclasses 188.1+ for selectable band receivers.

307 Integrated circuits:

This subclass is indented under subclass 250. Subclass matter under having a combination of interconnected elements inseparably associated on or within a continuous substrate.

(1) Note. If a claimed preferred embodiment of a patent application includes details of means to apply a variable electrical signal to an IC amplifying device, or details of means to utilize the output of an IC amplifying device, that application is properly classified in this subclass.

(2) Note. If, however, a claimed preferred embodiment of a patent application is limited to details of an IC amplifying device, without details of the input or output (utilization) means, or the input or output (utilization) means are recited in name only, then the application is properly classified outside this class.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for active solid-state devices, especially subclasses 115, 123, and 162-166 which are directed to devices involving amplification. See the (2) Note above.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 564+ for miscellaneous circuits which are integrated.

308 Including atomic particle or radiant energy impinging on a semiconductor:

This subclass is indented under subclass 250. Subject matter in which the amplifying device semiconductor body is subjected to radiant energy which may be in the form of light, free (unrestrained) electromagnetic energy, gamma rays, etc.., or atomic particle bombardment, such as alpha or beta rays, etc..

(1) Note. If a claimed preferred embodiment of a patent application includes details of means to apply a variable electrical signal to an IC amplifying device, or details of means to utilize the output of an IC amplifying device, that application is properly classified elsewhere in this class (330).

(2) Note. If, however, a claimed preferred embodiment of a patent application is limited to details of an IC amplifying device without details of the input or output (utilization) means, or the input or output (utilization) means are recited in name only, then the application is properly classified elsewhere outside this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

4, for maser-type amplifying device which may involve a semiconductor.

5, for solid element wave propagating amplifying devices involving coupling or activation by electromagnetic wave energy applied through wave energy constraining wave propagating means, such as by wave guide.

307, for a claimed preferred embodiment of a patent application includes details of means to apply a variable electrical signal to an IC amplifying device, or details of means to utilize the output of an IC amplifying device.

SEE OR SEARCH CLASS:

250, Radiant Energy, particularly subclasses 370.01+ for methods and apparatus using an invisible radiant energy-responsive semiconductor device.

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for active solid-state devices, especially subclass 115 which is directed to light responsive devices involving amplification. See (2) Note above.

313, Electric Lamp and Discharge Devices, appropriate subclasses for discharge devices involving the structure of ray energy generating, beaming and focusing, in the form of electron beams, alpha ray, and X-ray emanations.

315, Electric Lamp and Discharge Devices: Systems, subclasses 1+ for cathode ray discharge devices involving circuits or special circuit structure associated with the device.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 509+ for miscellaneous nonlinear solid-state circuits subjected to some external effect.

359, Optics: Systems (Including Communication) and Elements, subclasses 333+ for laser amplifiers.

309 Involving structure of three diverse function electrode type:

This subclass is indented under subclass 250. Subject matter wherein the semiconductor device is provided in three diverse-type electrodes for coupling the signal energy input and output, additional biasing or gain control, etc.., and the application of the controlled electrical energy source in which each electrode performs a distinct function.

(1) Note. If a claimed preferred embodiment of a patent application includes details of means to apply a variable electrical signal to an IC amplifying device, or details of means to utilize the output of an IC amplifying device, that application is properly classified elsewhere in this class.

(2) Note. If, however, a claimed preferred embodiment of a patent application is limited to details of an IC amplifying device without details of the input or output (utilization) means, or the input or output (utilization) means are recited in

name only, then the application is properly classified elsewhere outside this class.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for active solid-state devices, especially subclasses 115, 123 and 162 through 166 which are directed to devices involving amplification.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for similar semiconductor devices in miscellaneous circuits.

310 Including plural stages cascaded:

This subclass is indented under subclass 250. Subject matter including a plurality of stages of amplification, such that the input signal for each stage, except the first, is the output of the preceding stage.

SEE OR SEARCH THIS CLASS, SUBCLASS:

3, for plural diverse-type amplifying devices which may be cascaded and which may include a semiconductor-type amplifying device.

70+, for series energized vacuum tube amplifiers which may be cascaded.

88+, 92 and 98+, for cascaded amplifiers with signal feedback.

150, for cascaded vacuum tube amplifying devices of different characteristics.

151, for cascaded vacuum tube amplifier devices with means to bypass a stage.

152+, for cascaded vacuum tube amplifier means differently coupled between stages.

157+, for interstage coupling between stages of amplifying devices.

311 Having different configurations:

This subclass is indented under subclass 310. Subject matter wherein at least one of the cascaded stages is of a different configuration from at least one of the other cascaded stages.

(1) Note. In a semiconductor amplifier having emitter, base, and collector electrodes, input signal current flows through two electrodes thereof, and output signal current flows through two electrodes thereof, one of the electrodes being common to both input and output circuits. Therefore, in the three electrode semiconductor amplifier, there is a common electrode, an input electrode and an output electrode. By the configuration of a semi-conductor amplifier is meant the arrangement of base, emitter, and collector electrodes thereof, as the input, common, and output electrodes thereof. The configuration is usually referred to as common base, common emitter, or common collector configuration, but this does not completely define the configuration which must have at least one of the other semiconductor electrodes identified by its function as input or output electrode.

SEE OR SEARCH THIS CLASS, SUBCLASS:

153, for cascaded vacuum tube amplifier devices with differently coupled interstage circuits including at least one cathode follower stage.

157+, appropriate subclasses thereunder, for interstage coupling to or from electrodes and as cathode, or from electrodes such as cathode or screen grid not used in the majority of vacuum tube amplifiers as input or output electrode.

168, for vacuum tube interstage transformer coupling from the cathode.

END